

MEASURING ANGLER ATTITUDES TOWARD THE CATCH-RELATED  
ASPECTS OF RECREATIONAL FISHING

A Dissertation

by

DAVID K. ANDERSON

Submitted to the Office of Graduate Studies of  
Texas A&M University  
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

August 2005

Major Subject: Wildlife and Fisheries Sciences

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## ABSTRACT

Measuring Angler Attitudes Toward the Catch-Related  
Aspects of Recreational Fishing. (August 2005)

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The primary purposes of this dissertation were understanding the nature of an attitudinal scale designed to measure the consumptive orientation of recreational anglers and filling a gap in the published literature regarding measurement using the scale. Consumptive orientation was defined as the attitude anglers hold towards catching fish, including catching something, retaining fish (as opposed to releasing), catching large fish (size), and catching large amounts of fish (numbers). In order to confirm these four attitudes are measured by the scale, a model was hypothesized and tested using a confirmatory factor analysis on a sample of male anglers in Texas. It was reasoned that a different subculture may interpret the attitudinal statements differently; thus, the structure of the scale was explored using women as a separate sample. Finally, an example of how the scale could be used was provided by examining differences between tournament and nontournament anglers' attitudes towards the four constructs measured by the scale. Overall, results were varied with the hypothesized model used to confirm the scale. While results indicated dropping four of the sixteen statements would not

result in a significant change in the structure of the scale, results also confirmed there were four distinct attitudes measured by the consumptive orientation scale. The use of the scale with the larger angling population was confirmed by finding the same structure using a sample of women anglers. Finally, the scale was shown to be useful for examining activity-specific differences in angling social worlds. Differences were detected between tournament and nontournament anglers on three of the four consumptive attitudes: “catching numbers,” “catching large/trophy fish,” and “retaining fish.” Differences found were related to the commitment level of tournament and nontournament anglers. Further analysis examined how avidity may have affected differences among angler groups. These differences further current knowledge about tournament anglers and their expectations for fishing experiences. Overall, results support the usefulness of the consumptive orientation scale as a survey tool for understanding recreational fishing clientele.

## DEDICATION

For my girls.

## ACKNOWLEDGEMENTS

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## CHAPTER I

### INTRODUCTION AND LITERATURE ANALYSIS

#### **Introduction**

Fisheries management is a complicated task when considering the range of biological and social factors that must be accounted for in sound decision making. Not only are fisheries managers responsible for ensuring the biological integrity of an ecosystem, they must also be concerned with providing anglers with fishing opportunities, satisfying experiences as a result of these opportunities, and sustainable license sales on which their budgets depends. These latter concerns can be referred to as the “human” side of the management equation, and are often issues which managers must confront on a daily basis.

One recurring issue in the social component of recreational fisheries management is understanding *why* people go fishing. Managers cannot assume that people go fishing just to catch fish; the real question that managers must answer, and historically have not understood very well, involves the entire package of experiences associated with fishing. There are two aspects of this question. One deals with the general benefits of recreational fishing, or aspects of recreational fishing that can be experienced in other outdoor activities besides fishing (activity-general). The other deals with specific aspects of the recreational fishing experience, or those benefits that are thought to be

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This dissertation follows the style and format of the North American Journal of Fisheries Management.

unique to recreational fishing (activity-specific). These activity-specific benefits concern the catch-related rather than the non-catch-related motivations for participating in recreational fishing. It is important to note that terms like “motivations,” “benefits sought,” and “experience preferences” are generally interchangeable; they all relate to the expected or preferred outcomes associated with participation in an activity (Driver and Cooksey 1977). Fishery managers generally see these catch-related aspects of fishing as more endogenous or amenable to management efforts than the activity-general or non-catch-related aspects.

This dissertation dealt with the activity-specific aspects of recreational fishing. It has long been understood that catching fish is an integral part of the angling experience. However, it is not necessarily the only or the most important experience sought from fishing. Getting away from the regular routine, experiencing nature, and being with family/friends are often cited as important motivations for going fishing, as well as for many other outdoor recreational activities (Knopf et al. 1973; Driver and Cooksey 1977; Fedler and Ditton 1994). While it is well understood why these factors may motivate a person to go fishing, the nature of the activity-specific aspects of recreational fishing are less well understood. Defining these aspects as consumptive orientation, Graefe (1980) first recognized the need for understanding the exact nature of the activity-specific motivations for fishing and proposed questionnaire items designed to measure these motivations. Besides Graefe’s early work on these items, there is little attention in the published literature to the catch-related aspects of recreational fishing. The purposes of this dissertation were to 1) confirm that a modified version of Graefe’s (1980) scale

items are appropriate measures of an angler's attitudes toward the catch-related aspect of recreational fishing, 2) assess the scale in a different cultural context (i.e., women), and 3) use the scale to examine differences between two sub-populations of recreational anglers (tournament vs. nontournament black bass anglers) and how avidity towards tournament fishing affects consumptive attitudes.

This chapter is organized in the following manner. First, a broad overview of what is meant by consumptive orientation is provided. Second, since the items developed by Graefe (1980) were designed to measure anglers' attitudes, a conceptual framework regarding the nature of attitudes and their use in behavioral research is outlined. Third, a detailed analysis of previous literature regarding motivations for recreational fishing (experience preferences or benefits sought) is completed and related to previous research specific to the catch-related aspects of recreational fishing. Fourth, there is a general discussion of the effects that gender may have on recreational fishing experience preferences. Fifth, previous literature concerning tournament anglers is evaluated to examine differences between tournament and nontournament anglers, and how this may affect consumptive orientation. Finally, the organization of the dissertation is discussed, including techniques used for analysis.

### **Conceptual Framework and Literature Analysis**

#### *Defining Consumptive Orientation*

In this section, the term "consumptive orientation" as originally coined by Graefe (1980) is defined and discussed in terms of the items used to measure the construct.

Also, the questionnaire items used to measure anglers' attitudes towards the catch-related aspects of recreational fishing are briefly introduced.

First, it is necessary to define consumptive orientation. According to The American Heritage Dictionary of the English Language, 4th Edition, this is defined as the "tendency to consume." However, this is only one aspect of consumptive orientation as used in the dissertation. Consumption for an angler generally means catching fish. However, many other factors can play a role in an angler's desire to catch fish. Based on an expert panel of judges, Graefe (1980) identified fourteen statements designed to elicit attitudinal responses from anglers about all aspects of the catch experience. An attitude is defined as "a disposition to evaluate certain objects, actions, and situations in certain ways" (Chein 1967), or the positive or negative disposition regarding the specific aspects of an experience. Based on Graefe's (1980) wording of the original fourteen statements, he hypothesized that an angler can have stronger or weaker feelings towards the notion of consumptive orientation. Through subsequent analyses, he identified four constructs related to the consumptive aspects of the fishing experience. These constructs were labeled number of fish caught, disposition of catch, general orientation to catching something, and statements related to type of fish caught. Therefore, consumptive orientation is defined as the attitude anglers hold towards catching fish, including catching something, retaining fish (as opposed to releasing), catching large fish (size), and catching large amounts of fish (numbers).

The consumptive orientation scale has undergone many changes since it was first designed. The original work (A.R. Graefe, Pennsylvania State University, unpublished

data) proposed twenty-one items designed to measure two dimensions of the catch experience: catch and keep. He concluded that only nine of the twenty-one items were useful for further analysis. Graefe (1980) further refined the scale for use in his doctoral dissertation. He used sixteen items and proposed there were four dimensions of the catch experience measured in the scale: number of fish caught, type of fish caught, disposition of catch, and general orientation to catching something. However, using a factor analysis on a sample of boat anglers, he concluded that the scale measured six domains of consumptive orientation: number of fish caught, disposition of fish caught, general orientations towards catching something, and three aspects related to the type of fish (catching big fish, trophy fish, and challenging game fish). The original sixteen items used by Graefe (1980) are listed in Table 1.

Since 1980, the scale has undergone two major changes. The first change occurred with the first statewide survey of saltwater anglers conducted in Texas in 1986. Texas Parks and Wildlife Department (TPWD) officials were interested in certain aspects of the scale, so seven additional items were added and nine items were dropped (D. Loomis, University of Massachusetts-Amherst, personal communication). The added items generally dealt with the importance of keeping fish and number of fish caught in order to accommodate both saltwater and freshwater angling populations. Several variations were used by the Texas A&M University (TAMU) Human Dimension of Fisheries Lab over the next five years, with the total number of items appearing in the scale ranging from nine to fifteen. In 1992, the number of items was increased to sixteen for a spotted seatrout angler survey. The reason for this was to include several items that



**Table 1.—Original statements intended to measure catch-related attitudes toward recreational fishing (Adapted from Graefe 1980).**

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**Number of fish caught dimension**

A full stringer is the best indicator of a good fishing trip <sup>a</sup>

The more fish I catch, the happier I am <sup>a</sup>

A successful fishing trip is one in which many fish are caught

**Disposition of catch dimension**

I'm just as happy if I don't keep the fish I catch <sup>a</sup>

Keeping the fish I catch is more enjoyable than releasing them <sup>b</sup>

Cleaning fish is worth it to be able to eat the fish I catch <sup>a</sup>

Bringing fish home to the table is an important outcome of fishing

**General orientation to catching something dimension**

When I go fishing, I'm not satisfied unless I catch at least something <sup>b</sup>

If I thought I wouldn't catch any fish I wouldn't go fishing <sup>a</sup>

A fishing trip can be successful to me even if no fish are caught

When I go fishing, I'm just as happy if I don't catch a fish <sup>a</sup>

If I was sure I would catch fish, I wouldn't go fishing

**Statements related to type of fish caught**

The bigger the fish I catch, the better the fishing trip <sup>a</sup>

Catching a trophy fish is the biggest reward to me <sup>b</sup>

I'm happiest with a fishing trip if I catch a challenging game fish

It doesn't matter to me what type of fish I catch

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<sup>a</sup> Item originally appeared in Graefe (unpublished data).

<sup>b</sup> Item originally appeared in Graefe (unpublished data), but reworded in Graefe (1980).

appeared in the original scale (Graefe 1980), replacing items that were considered regulatory in nature. It also increased the number of items intended to measure each of the four proposed constructs to four (M. Fisher, Texas Parks and Wildlife Department, personal communication). Since 1992, the scale has included sixteen items, with four items designed to measure each of the four constructs of catching fish, retaining fish (as opposed to releasing), catching large fish (size), and catching large amounts of fish (numbers). However, since previous attempts to validate the scale have shown that only two items load into the “catching numbers” factor (S. Sutton, Cooperative Research Center for Reef Research, Townsville, Australia, personal communication; K. Hunt, Mississippi State University, personal communication), two additional items from Graefe (unpublished data) were used in the most recent statewide angler survey in Texas to replace the items not found to be valid.

The wording of the current version of the consumptive orientation scale is presented in Table 2. The first subdimension hypothesized to exist in the scale was labeled “attitude towards catching something.” The second subdimension hypothesized to exist in the scale was labeled “attitude towards catching numbers of fish.” The third subdimension hypothesized to exist in the scale was labeled “attitude towards catching large/trophy fish.” The fourth subdimension hypothesized to exist was labeled “attitude towards keeping fish.” Using a multidimensional approach to each attitude should increase the ability of the scale to predict behavior (Burnkrant and Page 1988).

**Table 2.—Current wording of the sixteen statements intended to measure catch-related attitudes toward recreational fishing by the four hypothesized constructs of consumptive orientation.**

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**Attitudes towards catching something**

- A fishing trip can be successful even if no fish are caught <sup>a</sup>
- When I go fishing, I'm just as happy if I don't catch fish <sup>a</sup>
- If I thought I wouldn't catch any fish, I wouldn't go fishing
- When I go fishing, I'm not satisfied unless I catch at least something

**Attitudes towards catching numbers of fish**

- The more fish I catch, the happier I am
- A successful fishing trip is one in which many fish are caught
- A full stringer is the best indicator of a good fishing trip
- I'm happiest with a fishing trip if I catch at least the limit

**Attitudes towards catching large/trophy gamefish**

- I would rather catch 1 or 2 big fish than 10 smaller fish
- The bigger the fish I catch, the better the fishing trip
- I'm happiest with the fishing trip if I catch a challenging game fish
- I like to fish where I know I have a chance to catch a "trophy" fish

**Attitudes toward retaining fish**

- I usually eat the fish I catch
- I'm just as happy if I don't keep the fish I catch <sup>a</sup>
- I want to keep all the fish I catch
- I'm just as happy if I release the fish I catch <sup>a</sup>

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<sup>a</sup> Item reverse coded for analysis purposes.

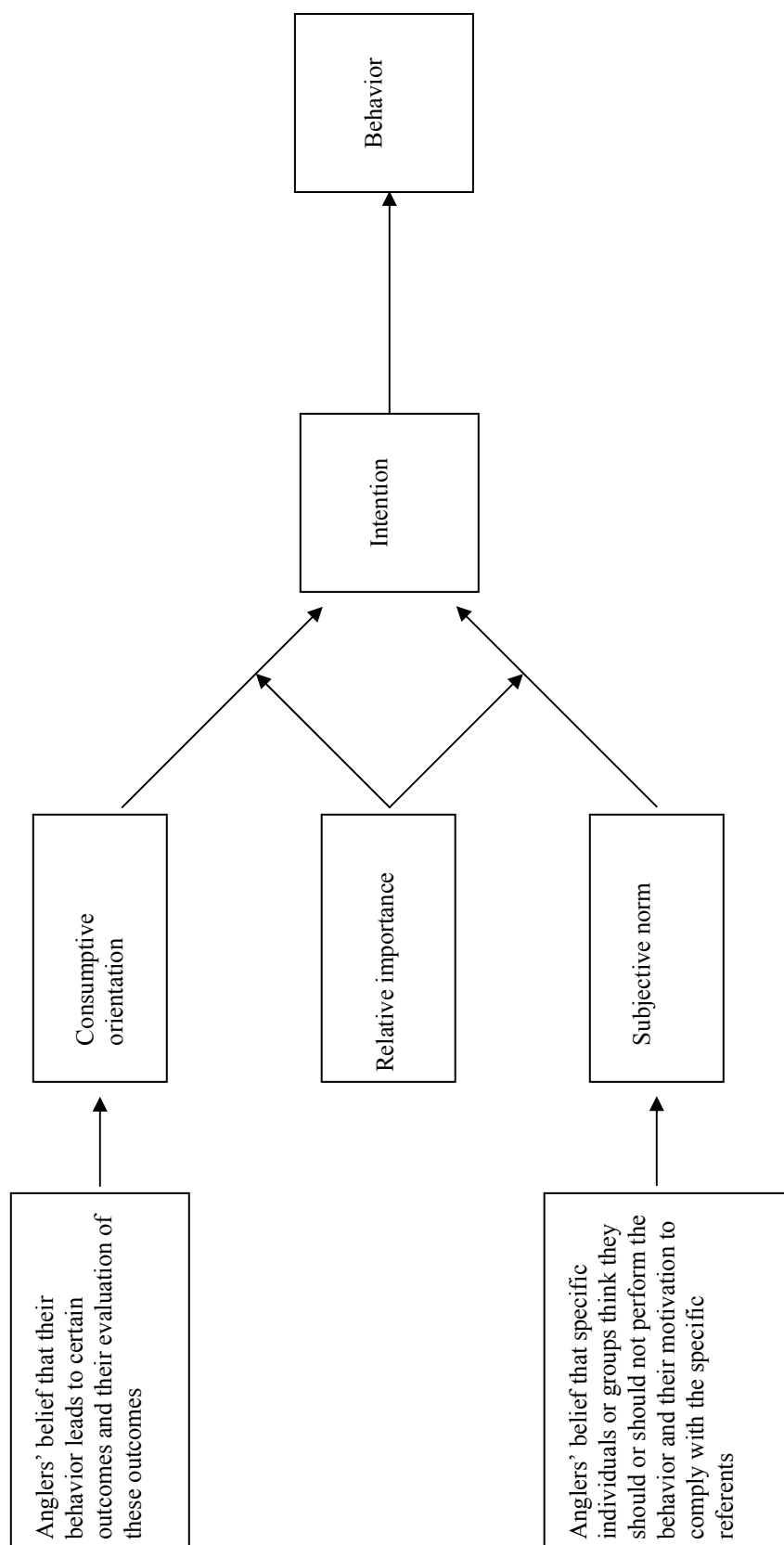
*Attitudes and Behavioral Research*

In this section, I analyze literature related to the study of attitudes and how attitudes can help predict human behavior. Since the four constructs in question were intended to measure attitudes towards specific aspects of the fishing experience, it was useful to examine why the measurement of attitudes is important. Previous theory suggests that knowing a person's attitudes allows for the prediction of a person's actions. Specifically, the theory of reasoned action (Fishbein and Ajzen 1975; Ajzen and Fishbein 1980) provides the means for using a person's attitudes to predict the intention of that individual with regard to his or her behavior. The framework is grounded in the overall sociological concept of normative behavior, namely, that people are rational animals, and only behave once they have reflected on their behavior. The theory posits that an individual's behavior can be predicted by the intention of the person to perform a given behavior. Intentions are influenced by two factors, the person's attitudes toward the behavior, and the subjective norms regarding the behavior (Ajzen and Fishbein 1980). First, subjective norms refer to what the person thinks "important others" will feel about performing the behavior. Important others may include friends, family, or even societal norms. The value a person holds towards these opinions also affects the influence that subjective norms have on performing a behavior. Second, the attitudes toward the behavior can be defined as the perception of outcomes associated with the behavior. Thus, if a person has positive attitudes toward performing a behavior (feels the outcomes will be beneficial) and perceives that others will approve of the behavior (or does not put any merit in their opinion), then the person will likely have a positive

intention for performing the behavior (Young and Kent 1985; Sheppard et al. 1988). A conceptual model of the theory of reasoned action is shown in Figure 1.

In particular, the research conducted in this dissertation falls into the box “consumptive orientation” in Figure 1. Although the four constructs in question do not directly measure attitudes towards specific behavior (i.e., a positive attitude towards catching large fish does not mean that a person will actually catch a large fish), being able to measure these attitudes is useful for explaining various behaviors. For example, if we know that a person has a positive attitude towards catching large fish, we could predict that person will fish at certain areas where the possibility of catching a large fish is greater. There are numerous examples of fishing behavior where knowing the attitudes towards the four constructs in the consumptive orientation scale would be beneficial. However, in order to predict specific angling behaviors, future research must take into account the other factors of models designed to predict specific behavior.

The theory of reasoned action has led to other frameworks that deal with the prediction of human behavior. The theory of planned behavior is a direct descendent of the theory of reasoned action (Ajzen 1991). The theory of planned behavior incorporates one other factor in explaining a person’s intentions to perform a given behavior, namely behavioral control. Behavioral control can be explained as the perception of difficulty involved in performing the behavior (Ajzen 1991). Since the purpose of this dissertation was not to explain any certain behavior, but rather to confirm that the attitudes towards the catch-related aspects of the fishing experience are valid



**Figure 1.—Conceptual diagram of how consumptive orientation affects angler behavior based on the theory of reasoned action (Adapted from Ajzen and Fishbein 1980).**

(and useful), limited attention will be given to a review of the theory of planned behavior. Basically, if one has full control over performing a behavior, then perceived behavioral control will have no effect on the performance of a behavior (Ajzen 1991; Rossi and Armstrong 1999; Hrubes et al. 2001). However, the more limitations, or at least perceived limitations there are, for performing a behavior, the more this aspect is likely to predict behavior (Madden et al. 1992).

Normally, the theory of planned behavior is used to explain participation in a given activity or the tendency to behave in a certain way. This could include support for various policies (Bright et al. 1993; Pate et al. 1996) or participation in consumptive activities like hunting (Rossi and Armstrong 1999; Hrubes et al. 2001). Participation in leisure activities (such as spending time at the beach, outdoor jogging or running, mountain climbing, etc.) has been found to be positively correlated with favorable attitudes toward participating in the activity (i.e., activity is beneficial to the individual), normative beliefs (i.e., others approve of the activity) and behavioral beliefs (i.e., possessing the skill to accomplish the activity) (Ajzen and Driver 1991, 1992). Different behaviors associated with certain outdoor recreation activities influenced the expected outcomes (benefits) associated with those activities, therefore, certain activities were more likely to produce the benefits that an individual desires (Daigle et al. 2002).

While there are certain situations where perceived behavioral control could be important in explaining or modifying fishing behavior (i.e., catch and release, knowingly breaking the law, and participating in fishing), the use of behavioral control is not important in the present discussion. What is essential is being able to measure attitudes

regarding the catch-related aspects of the fishing experience, which is useful for modifying the behavior of anglers (Fishbein and Manfredo 1992; Vincent and Fazio 1992; Bright et al. 1993). For example, if we knew a given population of anglers generally had a positive attitude towards catching large fish, then fishery managers can manage the fishery resource to produce this expected outcome. My task here was to make sure that the attitudes in question can be used in future research (and strengthen past research) aimed at predicting specific angling behaviors.

### *Experience Preferences*

This section examines previous literature regarding recreation experience preferences and how these preferences are related to the catch-related aspects of recreational fishing. Measuring why people engage in various recreational activities is essential to understanding a given activity. Most work on the measurement of motivations for participating in recreational activities can be traced to the development and validation of the Recreation Experience Preference (REP) scales (Driver 1977). These scales consist of numerous scale items which factor into nineteen separate domains: achievement/stimulation, autonomy/leadership, risk taking, equipment, family togetherness, similar people, new people, learning, enjoy nature, introspection, creativity, nostalgia, physical fitness, physical rest, escape personal-social pressures, escape physical pressures, social security, teaching-leading others, and risk reduction (Manfredo et al. 1996). The importance of measuring experience preferences or motivations is that differences between individuals or sub-populations can be investigated (Knopf et al. 1973; Driver and Knopf 1976; Driver and Cooksey 1977;



Graefe 1981; Wilde et al. 1998; Wilde and Ditton 1999) or persons with similar motivations can be analyzed (Ditton et al. 1982; Hautaluoma et al. 1982; Floyd and Gramann 1997).

Anglers are motivated to participate in recreational fishing for a variety of reasons. Some of these reasons are generic to outdoor recreation activity (e.g., getting away from the regular routine can be experienced in a variety of activities). Other reasons are specific to recreational angling (e.g., for the experience of the catch). Early work suggested that anglers are motivated by four fundamental factors: temporary escape, achievement, exploration, and experiencing natural surroundings (Knopf et al. 1973). All of these factors are activity-general and can be experienced in other outdoor recreation activities. Among activity-specific motivations, Fedler and Ditton (1994) examined five studies of freshwater and saltwater angling populations and reported that “for the challenge or sport of fishing,” “for the experience of the catch,” and “to obtain a trophy fish” were of low importance for at least two of the five populations. Also, they found that “to obtain fish for eating” was important in one of the saltwater population studies. Among the twelve sub-population studies they examined, these four reasons were found to be of higher importance. This leads to the conclusion that motivation studies must take into account the population under investigation, with studies of the more diverse general population often obscuring the importance of activity-specific motivations (Fedler and Ditton 1994).

Regardless of their importance and how they are measured, the catch-related aspects of recreational fishing are far less well understood. It was hypothesized that

there were more factors than the four activity-specific items used by Fedler and Ditton (1994), which led Graefe (1980) to develop the scale items under investigation in this dissertation.

Previous research making use of a consumptive orientation scale falls into two categories. The first category includes those studies that have attempted to validate some form of the scale (e.g., Aas and Vittersø 2000); the second category of research used the scale to place anglers into sub-categories (i.e., high vs. low consumptive) for further analysis (e.g., Fedler and Ditton 1986; Aas and Kaltenborn 1995; Graefe and Ditton 1997; Finn and Loomis 2001; Sutton and Ditton 2001).

Placing anglers into sub-categories is useful because of the multi-dimensionality of the entire population of recreational anglers. Many of these categories were based on the concept of recreation specialization (Bryan 1977; Ditton et al. 1992) as a conceptual framework (Chipman and Helfrich 1988; Loomis and Holland 1997; Romberg 1999; Wilde and Ditton 1999). Other studies used basic demographic characteristics (Hunt 2000) or species preference (Ross and Loomis 2001) to explain various angling behavior. Using the consumptive attitude as a categorical variable can be useful because it places anglers into sub-groups that have activity-specific meaning. Once consumptive groups have been established (e.g., “high” vs. “low” consumptive), differences on a number of variables can be analyzed, such as management preferences (Aas and Kaltenborn 1995; Fisher 1997), fishing participation and satisfaction (Fedler and Ditton 1986; Graefe and Fedler 1986), catch and release behavior (Graefe and Ditton 1997; Sutton and Ditton 2001), and expected outcomes of the fishing trip (Finn and Loomis

2001). Furthermore, consumptive orientation has been shown to be an important component of an angler's specialization level (Ditton et al. 1992). However, the aforementioned studies generally differed in their use of consumptive orientation items; some studies used mean scores on each item to examine differences whereas other studies summed the individual items in each factor before examining differences. Being able to validate the measurement of consumptive orientation will strengthen past and future research aimed at explaining specific angling behavior.

One previous attempt to validate the consumptive orientation scale yielded mixed results. Aas and Vittersø (2000) used the original sixteen items published in Graefe (1980) in an effort to confirm the measurement of consumptive orientation (i.e., they used an earlier version of the scale rather than a later version of the scale). While not an inherent problem in their study design, six of the sixteen items in the original scale are not currently used because of their failure to adequately measure any of the proposed constructs. The problem derived from the lack of published literature concerning the current version of the scale. Furthermore, Aas and Vittersø (2000) used a sample composed of Scandinavian anglers necessitating a change in wording and scale items to accommodate language and cultural differences. Whereas there should be no problem modifying the scale to fit particular cultural contexts, this could have impacted their conclusions regarding the number of constructs present in the scale and that some of their items measure more than one attitude (e.g., "Catching large fish is not important, more important is to catch fish for food"). Also, it is possible that other cultures view the catch-related aspects of recreational fishing differently than the traditional fishing

clientele of white, Anglo males that dominate angler samples in the United States, and who may assign different values to their fishing experience (Hunt 2000). Some of these possible differences were examined in this dissertation by using gender as a referent group.

### *Gender and Recreational Activities*

This section analyzes literature related to women's involvement in outdoor recreation activities. It builds on the previous discussion of experience preferences and how gender may affect the experience of participating in recreational fishing. In particular, the discussion focuses on possible theoretical differences in the attitudes women hold toward the catch-related aspect of recreational fishing.

There are gender differences in the types of activities in which people participate, as well as in their level of participation in these activities. A direct comparison of male and female participants was not possible due to the lack of readily available information at the national level; however, women have been compared previously to the entire hunting and fishing population. For example, in the most recent National Survey of Fishing, Hunting, and Wildlife Associated Recreation (USDI and USFWS 2002), women made up 26% of all anglers. However, only a small percentage (8%) of all women participated in fishing (compared to 25% of males in the U.S. participating in fishing, and constituting 74% of all anglers). The same ratio can be found in hunting; 1% of all women participated in hunting, constituting 9% of all hunters (compared to 12% of all men, constituting 91% of all hunters; USDI and USFWS 2002). In 1996, women participated in these two activities at about the same rate as in the most recent

national survey; about 9% of all women participated in fishing constituting 27% of all anglers and 1% of all women participated in hunting constituting 9% of all hunters (USDI and USFWS 1997). Frequency of participation was also less for women; in 2001 women hunted fewer days on average compared to all hunters (12 days vs. 18 days, respectively), made fewer trips for hunting than all hunters (10 trips vs. 15 trips), fished less when compared to all anglers (12 days vs. 16 days), and made fewer fishing trips when compared to all anglers (9 trips vs. 13 trips; Henderson 2004). In contrast, women made up the majority (54%) of wildlife watchers in the U.S. in 2001 and had higher rates of participation than men (31% of women participated compared to 28% of men; USDI and USFWS 2002).

There are several possible explanations why women participate more in certain outdoor recreation activities than others. From a societal standpoint, gender roles, opportunities, peers, and self-concept are major reasons that young girls were not socialized into participating in outdoor recreation (Culp 1998). These constraints generally use some sort of societal pressure to condition girls into thinking outdoor activities are not suitable pursuits for girls. Gender roles are the way that girls have historically been taught to play appropriate activities that will prepare them for their role as a woman (e.g., playing with dolls so that they can be good mothers). The lack of opportunities to participate in outdoor activities range from lack of clubs that encourage young girls to participate in outdoor activities to parental influences on what activities they choose to do with their children during leisure time. Peer influences are related to these constraints; they provide the mechanism to teach young girls socially acceptable

behavior. Finally, self-concept is influenced by societal pressures and influences activity choice through personal feelings of skill and physical prowess. These constraints are even more pronounced for consumptive activities like hunting and fishing (Connelly et al. 1996) and in outdoor recreational activities that take place in “wild,” natural settings, often leading to a sense of fear in women (Virden and Walker 1999). Gender has also been shown to affect attitudes toward wildlife (Kellert and Berry 1987), meaning that the object of the activity influences whether or not women choose to participate in certain activities. For example, women may not choose to participate in deer hunting because of their affective feelings towards deer (i.e., the “Bambi” syndrome). The type of activity can also influence whether or not women choose to participate, or society mandates the activity may not be “appropriate” for women (Wiley et al. 2000). This leads to the general conclusion that most women are constrained from participating in certain outdoor recreational activities (like fishing), which may, in turn, influence the attitudes women hold toward the given activity.

Even if women hold different attitudes towards the expected outcomes of recreational fishing, the structure of the consumptive orientation scale was not expected to differ in its ability to measure the catch-related aspects of the recreational fishing experience. In spite of the motivation to participate in a given leisure activity, the structure of most leisure activities should be similar regardless of gender (Toth and Brown 1997). In other words, recreational fishing should provide the same experiences for women as it does for men. This does not mean that there are not gender differences among the importance of experiences involved in recreational fishing, only that the

experiences should be viewed similarly by women. For example, in previous investigations of hunting, women were as achievement oriented as males, but placed more importance on the aesthetic and social aspects of their hunting experience than males (Jackson 1988; Adams and Steen 1997). Furthermore, though some of the benefits derived from participating in a leisure activity differ among men and women (Philipp 1997), the ability of the consumptive orientation scale to quantify fishing related attitudes should be the same across gender.

However, other variables related to gender may affect the structure of the consumptive orientation scale. Research suggests that experience with an activity affects the structure of motivations for participating in that activity (Williams et al. 1990). In other words, as people become more experienced with an activity, they are able to make more distinct choices as to what motivates them to participate in that activity. Consequently, it may be that less experienced anglers are not cognitively aware of their underlying motivations for participating in fishing and may not exhibit the same factor structure as more experienced anglers. This may have affected the structure of the consumptive orientation scale when examined in the context of gender. Texas female anglers were less experienced than males when measured by years of experience in fishing and self-reported skill level (Ditton and Hunt 1996). According to Williams et al. (1990), less experienced anglers are expected to exhibit fewer factors when examining motivations for participating in fishing. Nevertheless, this dissertation only examined the factor structure of the consumptive orientation scale for men and women

separately; if differing factor structures were found, future research could be directed at using experience as a controlling variable.

### *Tournament Anglers*

This section examines previous literature on tournament anglers and the tournament angling experience. Previous work has shown that tournament anglers were a significantly different market segment than nontournament anglers when many variables were considered. Tournament anglers were generally younger, fished more days annually, and were more committed to the overall social world of fishing than nontournament anglers (Loomis and Ditton 1987; Falk et al. 1989; Gillis and Ditton 1998; Wilde et al. 1998). Commitment is expressed by three components that have been related to participation in outdoor activities (Buchanan 1985). The first component deals with the amount of “side bets” participants have invested in their chosen activity. These side bets can be either monetary or social, with social side bets including the extent of one’s social network of friends related to the activity. The second component of commitment is labeled affective attachment and deals with the self concept anglers have formed through their continuing participation in the activity. Finally, commitment involves the display of consistent behavior and implies the rejection of alternate behaviors. One way to measure commitment is by membership in fishing clubs or organizations and subscriptions to fishing-related magazines. For instance, Wilde et al. (1998) reported that 33% of black bass (*Micropterus* spp.) tournament anglers belonged to a fishing club compared to 5% of nontournament black bass anglers. Tournament



anglers were also much more likely to fish on vacation trips than nontournament anglers (Falk et al. 1989), another difference related to level of commitment.

Since tournament anglers are a subset of the angling population, tournament anglers were expected to have different attitudes towards participating in fishing than nontournament anglers. Specifically, tournament anglers were expected to place more importance than nontournament anglers on the consumptive orientation items (Loomis and Ditton 1987; Falk et al. 1989; Gillis and Ditton 1998; Wilde et al. 1998). However, it was not known if there were important differences among tournament anglers regarding consumptive attitudes that could have an important bearing on this group's overall commitment to management and conservation. It has been shown that it is possible to segment an angling population using activity-specific measures (Fedler and Ditton 1986; Graefe and Fedler 1986; Aas and Kaltenborn 1995; Fisher 1997; Graefe and Ditton 1997; Finn and Loomis 2001; Sutton and Ditton 2001); therefore, it was expected that segments of the tournament angling population will also exhibit differences on the catch-related aspects of recreational fishing.

### **Purpose and Objectives of the Dissertation**

This section begins by restating the purpose of the dissertation, followed by an outline of the chapters of the dissertation.

#### *Purpose of the Dissertation*

The purpose of this dissertation was to fill a gap in published literature by confirming that a modified version of Graefe's (1980) original scale items were appropriate measures of anglers' attitudes toward the catch-related aspect of recreational

fishing. Also, it examined the scale in a different cultural context (i.e., women), and used the scale to examine differences between two sub-populations of recreational anglers (tournament vs. nontournament black bass anglers) and the effects that tournament participation experience has on consumptive attitudes.

### *Organization of the Dissertation*

Chapter I consists of an introductory, comprehensive synthesis of existing knowledge concerning attitudes in general, and the concept of consumptive orientation in particular.

Chapter II was written for publication consideration by *Human Dimensions of Wildlife*. This paper examines the existing scale items used to measure consumptive orientation and used appropriate statistical techniques to show that the four factors present in the existing scale measured four different constructs of consumptive orientation. Also, the paper includes a history of the scale as developed initially by Graefe (1980) and points out items used over the last 25 years that were useful in improving the overall reliability of the scale and its various factors.

Chapter III consists of a paper to be submitted to *Leisure Sciences* for publication consideration. This paper further tested the reliability of scale items with a different sample, namely, women. Since the scale was developed for use with samples dominated by white, Anglo males, it was not clear if women viewed the items in the scale in the same way, or if they had different constructs of consumptive orientation. If the meanings that women hold toward fishing are not taken into account, future research on

the catch-related aspects of recreational fishing risks the potential for misinterpreting aggregate samples of all anglers (Toth and Brown 1997).

Chapter IV consists of a paper to be submitted to *North American Journal of Fisheries Management* for publication consideration. It begins by examining differences related to the commitment level of tournament and nontournament anglers (Buchanan 1985) and the effects that avidity of tournament anglers may have on commitment. Furthermore, the chapter examined consumptive attitudes between tournament and nontournament groups, between avid and casual tournament anglers, and related findings to how commitment affected use of the fishery resource.

Chapter V presents conclusions and a discussion of results. This chapter points out the relevance of the research findings, both in a conceptual and managerial sense, in light of previous research. It also lays out a future research agenda for increased understanding of anglers' consumptive orientation.

### **Methods**

This section describes the type and availability of data used in the dissertation. It also briefly explains the statistical techniques used to carry out the analysis.

#### *Data Availability*

Secondary data were used for all aspects of the dissertation. The data have been collected in a previous study conducted by the TAMU Human Dimensions of Fisheries Lab. The data were from a statewide survey of licensed Texas anglers conducted during the spring of 2002. I altered the wording of two of the scale items because previous attempts to validate the scale have shown that only two items load into the "catching

numbers” factor (S. Sutton, personal communication; K. Hunt, personal communication). Therefore, two additional items were designed to replace the items that were not valid.

### *Operationalization of Independent Variables*

A modified version of the scale originally developed by Graefe (1980) was used to measure each angler’s level of consumptive orientation. As discussed earlier, the scale consisted of sixteen items designed to measure different sub-dimensions of the consumptiveness concept (See Table 2). Respondents were asked to indicate whether they agreed or disagreed with each of the sixteen items. Level of agreement was measured on a 5-point agreement continuum ranging from “Strongly Disagree” to “Strongly Agree.” Four of the items were reverse coded for analysis purposes so a higher additive score on each of the proposed subdimensions should indicate stronger positive attitudes for that subdimension (i.e., a higher score on the keep subdimension means that an angler has stronger positive attitudes towards keeping fish).

Gender was measured with a dichotomous variable. Although previous research has suggested that sex roles are more important than biological gender when examining leisure, it was beyond the scope of this dissertation to classify respondents according to their level of “masculinity” or “femininity.” Instead, self-reported biological sex was used as the independent variable (for a thoughtful discussion of this issue, see Hirschman 1984; Henderson et al. 1988; and Henderson et al. 1996).

Participation in black bass tournaments was measured with a dichotomous variable. Respondents were asked if they participated in black bass fishing tournaments

and, as a follow up question, how many tournaments they have participated in “since this time last year.” Respondents that have fished in at least one tournament “since this time last year” were considered tournament anglers and those that did not were considered nontournament anglers, regardless if they have fished in black bass tournaments in previous years. This distinction was important as the consumptive orientation scale is designed to measure current attitudes towards fishing; it was thought that although an angler may have been a tournament angler at one point, their current status as a tournament angler would more directly affect their feelings towards attitudinal statements. Furthermore, tournament anglers were classified as being “avid” or “casual” tournament anglers based on the number of tournaments fished in “since this time last year.” Those tournament anglers that had fished in five or more tournaments, the average number of tournaments fished in by Texas anglers (Anderson and Ditton 2004), were classified as “avid.”

### *Statistical Analysis*

Confirmatory factor analysis (CFA) was used to verify the four constructs hypothesized to exist in the scale. It is appropriate when scale items are developed with the specific intention of measuring a given construct (Kim and Mueller 1978b). Results of the CFA can provide the basis for testable hypotheses regarding quantifiable differences among scales (e.g., ordinal and interval).

Exploratory factor analysis was used for the sample consisting of women anglers. Because we do not know if men and women similarly perceive the attitudes presented in the scale, an exploratory factor analysis was appropriate to ascertain if there were

different factors of consumptive orientation between groups (Kim and Mueller 1978b). The exploratory technique differs from the confirmatory technique in that pre-existing structures in the data are not hypothesized; results provide defensible answers that can later be tested with independent data.

Finally, differences between tournament and nontournament groups were analyzed using a variety of techniques. Where nonnormality occurred for a particular interval level variable, differences were examined using the non-parametric Kruskal-Wallis  $k$ -sample test. For normal interval level data,  $t$ -tests were used. One assumption of the standardized  $t$ -test is that the two groups being examined have equal variances. When this assumption was violated (indicated by the Folded  $F$ -statistic), the Satterthwaite correction was used to determine statistical significance (SAS Institute 2000). Ordinal level data were tested using the non-parametric Kruskal-Wallis  $k$ -sample test. Finally, nominal level data were examined using Pearson chi-square tests of homogeneity. In all cases, the level of significance was set at 0.05.

## CHAPTER II

### CONFIRMATION OF A SCALE MEASURING ANGLER ATTITUDES TOWARD THE CATCH-RELATED ASPECTS OF RECREATIONAL FISHING

#### **Introduction**

It has long been understood that catching fish is an integral part of the angling experience; however, it is not the only experience sought from the activity. Getting away from the regular routine, experiencing nature, and being with family/friends have often been cited as important motivations for going fishing, as they are as well for many other outdoor recreational activities (Knopf et al. 1973; Driver and Cooksey 1977; Fedler and Ditton 1994). While it is well understood why these factors may motivate a person to go fishing, the nature of the activity-specific aspects of recreational fishing is less well understood. Defining these aspects as consumptive orientation, Graefe (1980) first recognized the need for understanding the exact nature of the activity-specific motivations for going fishing and proposed a scale of items designed to measure related attitudes. Except for Graefe's early work on these items, there is a gap in the published literature concerning the catch-related aspects of recreational fishing. Therefore, the purpose of this chapter was to confirm that a modified version of Graefe's (1980) original scale items were appropriate measures of an angler's attitudes toward the catch-related aspect of recreational fishing.

### *Defining Consumptive Orientation*

According to The American Heritage Dictionary of the English Language, 4th Edition, consumptive orientation is defined as the “tendency to consume,” or in the case of the recreational angler, disposition to catch fish. This is only one aspect of consumptive orientation in the context of fishing. It can also mean keeping fish, the amount of fish caught, the size of fish caught, and keeping the fish caught. In general, these variables can be used to measure an angler’s dependence on the fishery resource. However, different segments of the angling population may have different wants and needs, and place more or less stress on the fishery resource itself (Fisher 1997). Therefore, it is important to be able to measure what anglers expect to receive from their fishing experiences so that managers can make decisions that produce more satisfying fishing experiences. One means of determining these expectations is by measuring angler attitudes toward specific aspects of their fishing experiences. An attitude is defined as “a disposition to evaluate certain objects, actions, and situations in certain ways” (Chein 1967), or the positive or negative disposition regarding the specific aspects of an experience. Consequently, consumptive orientation is defined as the attitudes anglers hold towards catching something, retaining fish (as opposed to releasing), catching large fish (size), and catching large amounts of fish (numbers).

The consumptive orientation scale has undergone many changes since first designed. The original work, done by Graefe (unpublished data), proposed twenty-one items designed to measure two dimensions of the catch experience: catch and keep. Based on an analysis of alpha reliability coefficients, he concluded only nine of the



twenty-one items were useful for further analysis. Graefe (1980) further refined the scale with an additional six items and proposed there were four dimensions of the catch experience measured in the scale: number of fish caught, type of fish caught, disposition of catch, and general orientation to catching something. However, in using a factor analysis on a sample of registered boat owners in Texas, he concluded that the scale measured six domains of consumptive orientation: number of fish caught, disposition of fish caught, general orientations towards catching something, and three aspects related to the type of fish (catching big fish, trophy fish, and challenging game fish).

Graefe's scale has undergone two major changes since 1980. The first change occurred with the first statewide survey of saltwater anglers conducted in Texas in 1986. Texas Parks and Wildlife Department (TPWD) officials were interested in certain aspects of the saltwater fishing experience, so seven additional items were added and nine items were dropped (D. Loomis, personal communication). The items added generally dealt with the importance of keeping fish and number of fish caught in a saltwater fishing context. Several variations were used by the TAMU Human Dimension of Fisheries Lab over the next five years, with the total number of items appearing in the scale ranging from nine to fifteen. In 1992, the number of items was increased to sixteen to include several items that appeared in the original scale (Graefe 1980) and to replace items that were considered regulatory in nature. The number of items intended to measure each of the four proposed constructs was increased to four (M. Fisher, personal communication). Since 1992, the scale has included sixteen items, with four items designed to measure each of the four constructs: catching fish, retaining

fish (as opposed to releasing), catching large fish (size), and catching large amounts of fish (numbers). However, since previous attempts to validate the scale have shown that only two items load into the “catching numbers” factor (S. Sutton, personal communication; K. Hunt, personal communication), two additional items from Graefe (unpublished data) were used in a recent statewide angler survey in Texas to replace the items not found to be valid.

The current version of the consumptive orientation scale, along with the notation to be used when referring to the latent factors and their observed variables, is presented in Table 3. The order of the items in the questionnaire was random; they were grouped here to assist in interpretation of the analysis. Based on the early work by Graefe (1980) and subsequent work by Hunt (2000), Sutton (2001), and Sutton and Ditton (2001), the first subdimension (F1) hypothesized to exist in the scale was labeled “attitudes towards catching something.” The second subdimension (F2) hypothesized to exist in the scale was labeled “attitudes towards catching numbers of fish.” The third subdimension (F3) hypothesized to exist in the scale was labeled “attitudes towards catching large/trophy fish.” The fourth subdimension (F4) hypothesized to exist was labeled “attitudes towards keeping fish.” Using a multidimensional approach to each attitude should increase the ability of the scale to predict behavior (Burnkrant and Page 1988).

**Table 3.—Current wording of the sixteen statements intended to measure catch-related attitudes toward recreational fishing by the four hypothesized constructs of consumptive orientation.**

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**Attitudes towards catching something (F1)**

- V1 - A fishing trip can be successful even if no fish are caught (NOFISH) <sup>a</sup>
- V2 - When I go fishing, I'm just as happy if I don't catch fish (HAPPY) <sup>a</sup>
- V3 - If I thought I wouldn't catch any fish, I wouldn't go fishing (NOCATCH)
- V4 - When I go fishing, I'm not satisfied unless I catch at least something (SOMETHING)

**Attitudes towards catching numbers of fish (F2)**

- V5 - The more fish I catch, the happier I am (MOREFISH)
- V6 - A successful fishing trip is one in which many fish are caught (MANYFISH)
- V7 - A full stringer is the best indicator of a good fishing trip (FULLSTRING)
- V8 - I'm happiest with a fishing trip if I catch at least the limit (LIMIT)

**Attitudes towards catching large/trophy gamefish (F3)**

- V9 - I would rather catch 1 or 2 big fish than 10 smaller fish (BIGFISH)
- V10 - The bigger the fish I catch, the better the fishing trip (BIGBETTER)
- V11 - I'm happiest with the fishing trip if I catch a challenging game fish (CHALLENGE)
- V12 - I like to fish where I know I have a chance to catch a "trophy" fish (TROPHY)

**Attitudes toward retaining fish (F4)**

- V13 - I usually eat the fish I catch (EAT)
- V14 - I'm just as happy if I don't keep the fish I catch (DONTKEEP) <sup>a</sup>
- V15 - I want to keep all the fish I catch (WANTKEEP)
- V16 - I'm just as happy if I release the fish I catch (RELEASE) <sup>a</sup>

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<sup>a</sup> Item reverse coded for analysis purposes.

Previous research making use of a consumptive orientation scale falls into two categories. The first category includes those studies that have attempted to validate some form of the scale (Aas and Vittersø 2000); the second category used the scale to place anglers into sub-categories (i.e., high vs. low consumptive) for further analysis (Fedler and Ditton 1986; Aas and Kaltenborn 1995; Graefe and Ditton 1997; Finn and Loomis 2001; Sutton and Ditton 2001).

Placing anglers into social subworlds (Unruh 1980) is useful because of the diversity of the population of recreational anglers. Many of these subworlds are based on the concept of recreation specialization (Bryan 1977; Ditton et al. 1992) as a conceptual framework (Chipman and Helfrich 1988; Loomis and Holland 1997; Romberg 1999; Wilde and Ditton 1999). Other studies used basic demographic characteristics (Hunt 2000) or species preference (Ross and Loomis 2001) to categorize anglers based on their behavior. Using the consumptive attitude as a categorical variable places anglers into sub-groups with activity-specific meaning. Once consumptive groups have been established (e.g., “high” vs. “low” consumptive), differences on a number of other variables can be analyzed, such as management preferences (Aas and Kaltenborn 1995; Fisher 1997), fishing participation and satisfaction (Fedler and Ditton 1986; Graefe and Fedler 1986), catch and release behavior (Graefe and Ditton 1997; Sutton and Ditton 2001), and expected outcomes of the fishing trip (Finn and Loomis 2001). Overall, these studies differed in their use of consumptive orientation items; some studies used mean scores on each item to examine differences while other studies sum the individual items in each factor before examining group differences. Being able

to validate the measurement of consumptive orientation should strengthen past research aimed at explaining specific angling behavior.

One previous attempt to validate the consumptive orientation scale reported mixed results. Aas and Vittersø (2000) used the original sixteen items published in Graefe (1980) in an effort to confirm the measurement of consumptive orientation (i.e., they used an earlier version of the scale rather than a later version of the scale). While not an inherent problem in their study design, six of the sixteen items in the original scale are not currently used because of their failure to adequately measure any of the proposed constructs. The problem lies in the lack of published literature concerning the current version of the scale. Furthermore, Aas and Vittersø (2000) used a sample composed of Scandinavian anglers necessitating a change in wording and scale items to accommodate language and cultural differences. Whereas there should be no problem modifying the scale to fit particular cultural contexts, it could have impacted their conclusions regarding the number of constructs present in the scale and that some of their items measure more than one attitude (e.g., “Catching large fish is not important, more important is to catch fish for food”). Also, it is possible that other cultures view the catch-related aspects of recreational fishing differently than the traditional fishing clientele of white, Anglo males that dominate angler samples in the United States, and who may assign different values to their fishing experiences than other cultures (Hunt 2000).

## Methods

Data came from a statewide survey of licensed angler in Texas conducted in the spring of 2002. The sampling frame consisted of anglers that purchased a resident fishing license in FY 2001 (September 1, 2000—August 31, 2001). Overall, 10,000 anglers were included in the sample.

An 11-page questionnaire was administered to the sample of Texas anglers. Questions were developed to assess anglers' behaviors, attitudes, and preferences for fisheries management practices, and demographics. A modified version of the scale originally developed by Graefe (1980) was used to measure an angler's level of consumptive orientation. As discussed, the scale included sixteen items, each of which had been designed to measure different sub-dimensions of consumptiveness. The scale has consistently sought to measure four subdimensions of anglers' attitudes towards catching fish. Respondents were asked to indicate whether they agreed or disagreed with each of the sixteen items. Level of agreement was measured on a 5-point agreement continuum ranging from "Strongly Disagree" to "Strongly Agree." Four of the items were reverse coded for analysis purposes, so a higher additive score on each of the proposed subdimensions should indicate stronger positive attitudes for that subdimension (i.e., a higher score on the "keep" subdimension means that an angler has a stronger positive attitude towards keeping fish).

Mailing procedures followed those of Salant and Dillman (1994). Excluding non-deliverable questionnaires ( $n = 1,666$ ), an effective response rate of 40% was achieved. Completed surveys were received from 3,302 license holders; of this number,

162 were not filled out by the person to whom the questionnaire was mailed and were screened out, two were screened out because of age requirements ( $\geq 18$ ), and 14 were screened out for various reasons (e.g., skeptical of government). Additionally, 494 license holders indicated they did not fish since this time last year; they were dropped from further analysis. A decision was made to exclude non-male ( $n = 464$ ), non-white anglers ( $n = 430$ ) because these various subcultures may vary in their attitudes toward recreational fishing (Hunt 2000). In addition, another 165 cases were dropped from the analysis because they had missing, incomplete scale responses, or item response sets.

### *Analysis*

To confirm the scale was influenced by the four latent factors, a model was developed to hypothesize the relationship between the sixteen observed variables and the four latent factors underlying the responses (Figure 2). In confirmatory factory analysis (CFA), a  $p \times p$  sample covariance matrix summarizes the responses to  $p$  observed variables, and it is hypothesized that the corresponding population covariance matrix can be summarized by  $q$  parameters, which are the factor loadings, the factor variances and covariances, and the residual variances (Bentler and Weeks 1980; Marsh et al. 1988). Two important assumptions must be met for the normal theory maximum-likelihood CFA approach to perform well. First, data must be continuous. Obviously this was not the case for rating scale data. Although it has been shown that five categories can be considered a threshold to treat ordinal data as continuous (Bollen and Barb 1981), the current analysis used the estimation of the polychoric correlation matrix, as suggested by Jöreskog (2002). The polychoric correlation matrix assumes there is an underlying

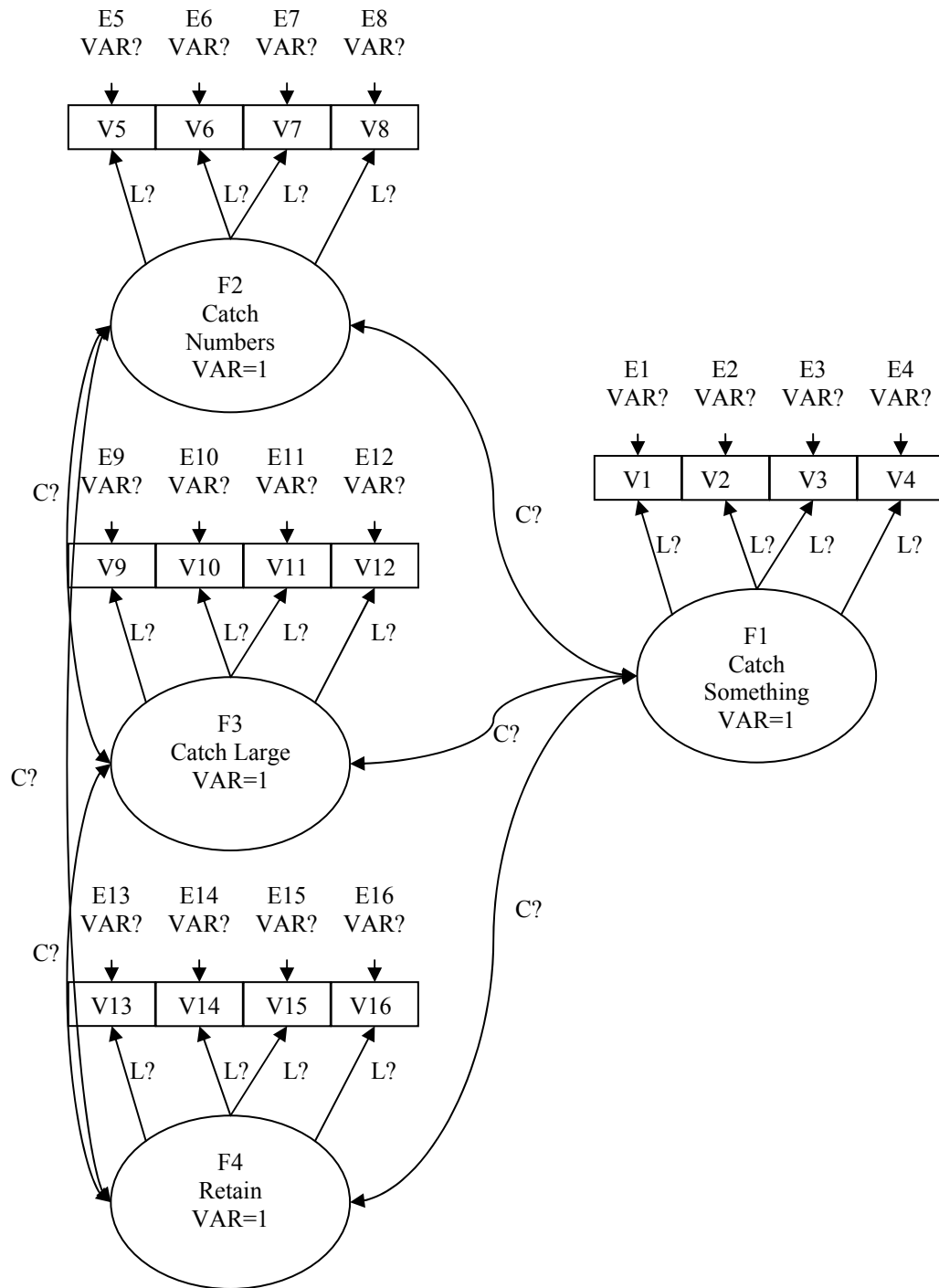


Figure 2.—Conceptual path diagram of the proposed model of the structure of the consumptive orientation scale. For an explanation of the individual observed variables (V) and their respective latent factors (F), see Table 3. Factor loadings are represented by L, VAR represents the variance associated with residual terms (E), C represents covariances between latent factors.



continuous variable,  $z^*$ , of the ordinal variable  $z$ , which is normally distributed (Jöreskog 1994). The asymptotic covariance matrix was then derived from this correlation matrix. These matrices were estimated using PRELIS 2.54 (Jöreskog and Sörbom 1996b).

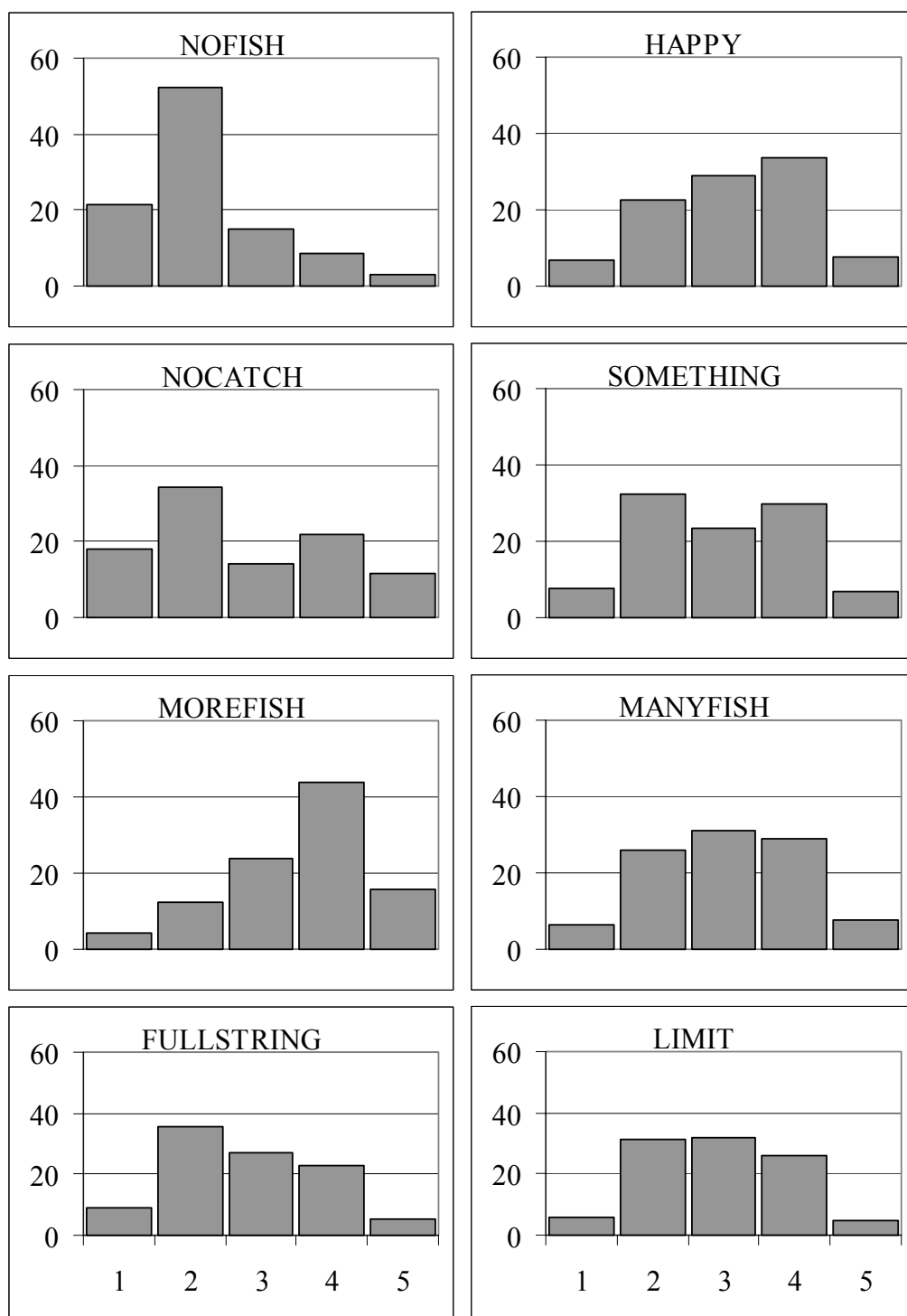
A second assumption of standard CFA approaches was that the data were multivariate normal. This assumption was tested using procedures outlined by D'Agostino et al. (1990) to check for univariate normality and Mardia's (1974) test statistic to check for multivariate normality.

The structural model was tested using LISREL 8.3 (Jöreskog and Sörbom 1996a). LISREL provided a number of goodness of fit indices to indicate whether the proposed model provided an acceptable fit to the data. Among these were the  $\chi^2$  value, with non-significant values indicating acceptable fit, the standardized root mean square residual (SRMR), the Tucker-Lewis Index (TLI), and the root mean square error of approximation (RMSEA). Acceptable values for the last three indices, as suggested by Hu and Bentler (1999), are 0.08 for SRMR, 0.95 for TLI, and 0.06 for RMSEA. Furthermore, LISREL provided a number of modification indices to improve the fit of the proposed model. Two options were available: one was to allow the errors associated with two observed variables to covary and the other was to allow an observed variable to load on a suggested latent factor. However, allowing a variable to load on more than one factor makes the final model more complicated to interpret (Anderson and Gerbing 1988). Since the purpose of the consumptive orientation scale was to produce an additive measure of the four latent factors, those observed variables that contributed the most to the inflated  $\chi^2$  value were dropped from the revised model.

## Results

Overall, there were 1,571 usable cases available for the CFA. Basic frequencies of angler responses are presented in Figure 3, along with other descriptive statistics in Table 4. Univariate skewness was marginally normal (range = -0.69 to 0.96) as was univariate kurtosis (range = 1.87 to 3.74). Since univariate normality is necessary, but not proof of multivariate normality, this assumption was checked using Mardia's (1974) normalized statistic for skewness (11.36,  $P < 0.0001$ ) and kurtosis (334.72,  $P < 0.0001$ ). Because the data were clearly non-normal, straight forward estimates in CFA using the normal-theory maximum likelihood method were not appropriate. Instead, analysis using the Satorra-Bentler (1988)  $\chi^2$  (S-B  $\chi^2$ ) value and associated robust statistics were used.

The polychoric correlation matrix is presented in Table 5. This table is included so this study can be replicated, which is essential if the body of knowledge on consumptive orientation is to expand (Boomsma 2000). Overall, correlations exhibited the expected structure of the proposed model; items within each latent factor correlated more with each other than with other items not intended to measure the same construct. The underlying bivariate normality of the data was also shown using the RMSEA statistic, which is similar to the RMSEA measure used for evaluating structural equation models (Jöreskog 2002); all values were above the recommended level of 0.1.



**Figure 3.—Frequency distributions of responses by male, Anglo anglers to statements intended to measure catch-related attitudes toward recreational fishing. Statements can be found in Table 3. The scale for attitudinal measurement is: 1 – strongly disagree; 2 – disagree; 3 – neutral; 4 – agree; 5 – strongly agree.**

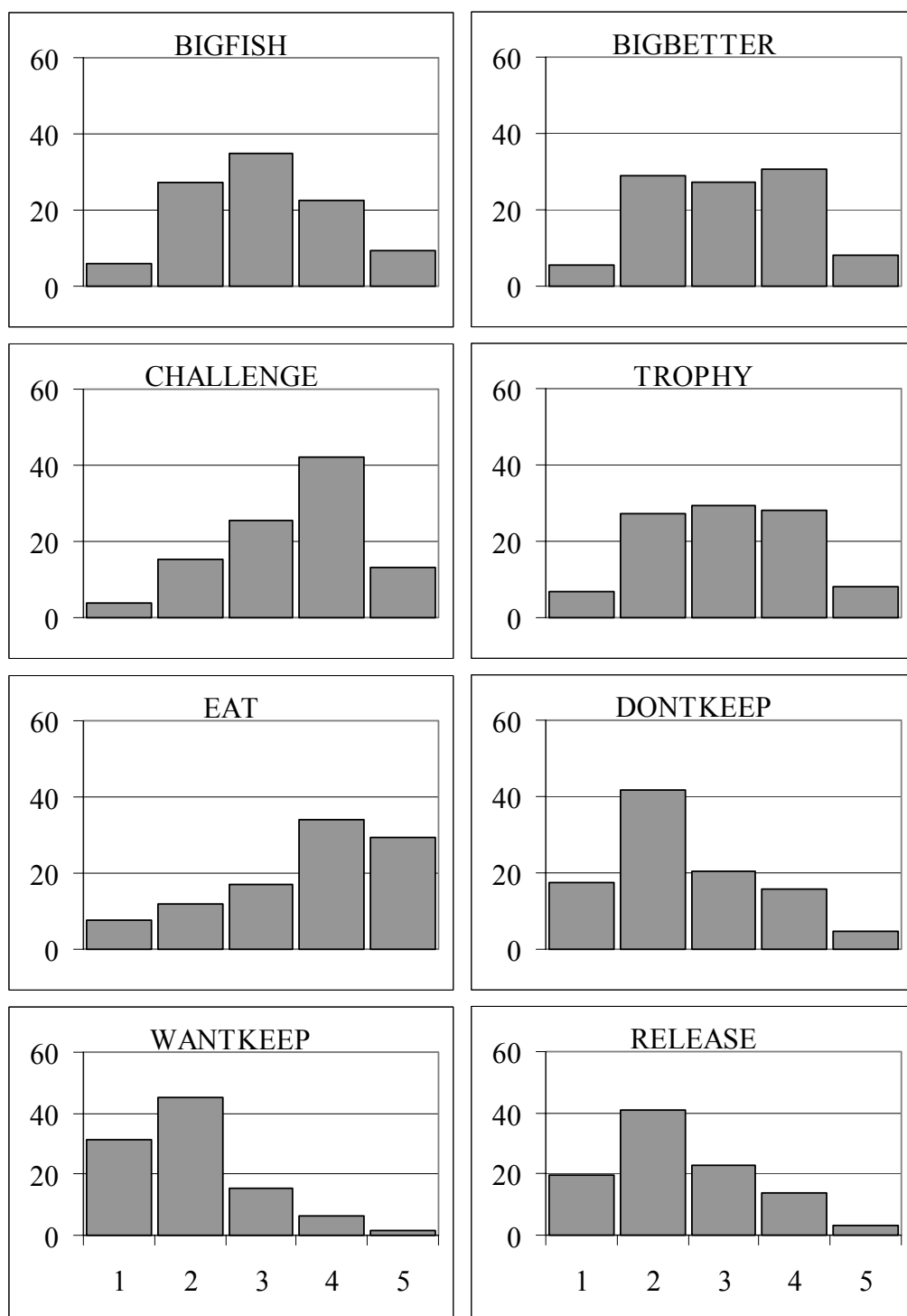


Figure 3.—Continued.

**Table 4.—Descriptive statistics of responses by male, Anglo anglers to statements intended to measure catch-related attitudes toward recreational fishing. Statements can be found in Table 3. The scale for attitudinal measurement is: 1 – strongly disagree; 2 – disagree; 3 – neutral; 4 – agree; 5 – strongly agree.**

<b>Variable</b>	<b>Mean</b>	<b>St. Dev.</b>	<b>Skewness (<math>\sqrt{B_1}</math>)</b>	<b>Kurtosis (<math>B_2</math>)</b>	<b><math>K^2</math></b>
NOFISH	2.19	0.96	0.96	3.74	197.10
HAPPY	3.13	1.07	-0.21	2.28	100.35
NOCATCH	2.75	1.30	0.30	1.87	748.20
SOMETHING	2.96	1.10	0.05 <sup>a</sup>	2.04	279.27
MOREFISH	3.54	1.03	-0.60	2.83 <sup>a</sup>	83.11
MANYFISH	3.05	1.05	-0.04 <sup>a</sup>	2.27	93.83
FULLSTRING	2.80	1.06	0.22	2.25	112.59
LIMIT	2.93	1.00	0.10 <sup>a</sup>	2.30	84.25
BIGFISH	3.02	1.06	0.13	2.37	60.98
BIGBETTER	3.07	1.06	0.00 <sup>a</sup>	2.14	176.25
CHALLENGE	3.46	1.02	-0.46	2.60	67.66
TROPHY	3.04	1.08	-0.01 <sup>a</sup>	2.20	127.73
EAT	3.66	1.23	-0.69	2.49	134.68
DONTKEEP	2.48	1.09	0.54	2.52	93.84
WANTKEEP	2.03	0.95	0.94	3.67	190.23
RELEASE	2.40	1.05	0.52	2.61	78.85

<sup>a</sup> Not significant at the 0.05 level.

**Table 5.— Polychoric correlation matrix of responses by male, Anglo anglers to statements intended to measure catch-related attitudes toward recreational fishing. Statements can be found in Table 3.**

	NO FISH	HAPPY	NO CATCH	SOME THING	MORE FISH	MANY FISH	FULL STRING	LIMIT	BIG FISH	BIG BETTER	CHAL LENGE	TROPHY	EAT	DONT KEEP	WANT KEEP	RELEASE
NOFISH	1.00															
HAPPY	0.60	1.00														
NOCATCH	0.44	0.47	1.00													
SOMETHING	0.56	0.52	0.57	1.00												
MOREFISH	0.24	0.31	0.32	0.36	1.00											
MANYFISH	0.42	0.38	0.38	0.49	0.58	1.00										
FULLSTRING	0.35	0.28	0.32	0.43	0.42	0.60	1.00									
LIMIT	0.30	0.26	0.29	0.42	0.46	0.53	0.57	1.00								
BIGFISH	-0.01	-0.07	0.02	0.08	0.01	0.07	0.04	0.04	1.00							
BIGBETTER	0.26	0.25	0.26	0.39	0.42	0.48	0.45	0.41	0.47	1.00						
CHALLENGE	0.06	0.12	0.12	0.21	0.22	0.19	0.14	0.19	0.37	0.44	1.00					
TROPHY	0.09	0.17	0.22	0.26	0.24	0.22	0.19	0.24	0.35	0.49	0.53	1.00				
EAT	-0.01	-0.01	0.06	0.09	0.04	0.12	0.24	0.10	-0.09	-0.09	-0.08	-0.11	1.00			
DONTKEEP	0.29	0.30	0.22	0.28	0.10	0.21	0.30	0.19	-0.09	-0.01	-0.16	-0.12	0.52	1.00		
WANTKEEP	0.18	0.08	0.18	0.24	0.15	0.29	0.38	0.32	-0.05	0.12	-0.10	-0.02	0.46	0.46	1.00	
RELEASE	0.29	0.30	0.21	0.27	0.10	0.19	0.31	0.16	-0.11	0.02	-0.22	-0.13	0.53	0.76	0.50	1.00

Once the polychoric correlation matrix was derived and examined for the expected structure, the table was analyzed using confirmatory factor analysis with the hypothesized structure presented previously. Results from the CFA are presented in Table 6. The hypothesized model indicated a mediocre fit between the model and the data (Model 1; S-B  $\chi^2 = 871.8$ , SRMR = 0.08, TLI = 0.91, RMSEA = 0.071). Modification indices suggested adding an error covariance between V10 and V9. However, since the purpose of the scale was to provide an additive measure of angler attitudes, it was decided to drop the item that contributed the most overall to the lack of model fit. The second model deleted V10 from analysis and resulted in some improvement in model fit (Model 2; S-B  $\chi^2 = 579.03$ , SRMR = 0.06, TLI = 0.93, RMSEA = 0.06). Again, modification indices were consulted and V2 was dropped from subsequent analysis. Results showed some improvement in model fit (Model 3; S-B  $\chi^2 = 394.17$ , SRMR = 0.06, TLI = 0.94, RMSEA = 0.05). The modification indices were checked again and V7 was deleted, providing some improvement in the fit of the model (Model 4; S-B  $\chi^2 = 296.99$ , SRMR = 0.05, TLI = 0.94, RMSEA = 0.05). Again, the modification indices were examined, and V15 was dropped from the next model. This provided the best overall fit of the model (Model 5; S-B  $\chi^2 = 190.67$ , SRMR = 0.05, TLI = 0.95, RMSEA = 0.04). Deletion of V1 from further analysis was considered but it was felt that deleting this variable would erode the overall theoretical basis of the scale and no further modifications were made.

**Table 6.—Goodness of fit indices from a confirmatory factor analysis on sixteen observed variables intended to measure catch-related attitudes toward recreational fishing. The original hypothesized model is shown in Figure 2. Acceptable models should have non-significant chi-square values and a SRMR = 0.08, TLI= 0.95, and RMSEA = 0.06.**

<b>MODEL #</b>	<b>S-B <math>\chi^2</math> (d.f.)</b>	<b>SRMR</b>	<b>TLI</b>	<b>RMSEA</b>
Model 1	871.80 (98)	0.078	0.91	0.071
Model 2	579.03 (84)	0.062	0.93	0.061
Model 3	394.17 (71)	0.058	0.94	0.054
Model 4	296.99 (59)	0.054	0.94	0.051
Model 5	190.67 (48)	0.045	0.95	0.044

To assess the reliability and validity of the constructs tested in the final model (Model 5), several indicators were available (Table 7). Indicator reliability, or the square of the standardized loading for the indicator variable, denotes the percent of variance explained by the factor on which the variable loads (Long 1983). Composite reliability is similar to Cronbach's alpha, in that it measures the internal consistency of the variables on each factor. Finally, the variance extracted estimates measure the amount of variance captured by the underlying factor in relation to the amount of variance due to measurement error.

The standardized loadings of the observed variables (range = 0.47 to 0.89) for the final model were in the acceptable range and all were statistically significant at the 0.05 level (Table 7). One possible concern was the loading for BIGFISH (0.47); however, the composite reliability for this construct was acceptable (0.69). The variance extracted estimates were also in the acceptable range (0.44 to 0.62), with "catching large/trophy fish" exhibiting marginal problems. Finally, because the correlation between "catching



something” and “catching numbers” was high (0.69; Table 8), a test for discriminant validity was used in order to show the two constructs were not related. Using a procedure outlined by Fornell and Larcker (1981), discriminant validity was determined because the square of the correlation between the two factors was less than the variance extracted estimates for the two factors ( $0.69^2 < 0.54$  and  $0.69^2 < 0.53$ ).

**Table 7.—Properties of the final revised measurement model derived from a confirmatory factor analysis of sixteen variables intended to measure catch-related attitudes toward recreational fishing. Statements can be found in Table 3.**

<b>Constructs and Indicators</b>	<b>Standardized Loading</b>	<b>t<sup>a</sup></b>	<b>Indicator Reliability</b>	<b>Variance Extracted Estimate</b>
<b>Catching Something</b>			0.77 <sup>b</sup>	0.54
NOFISH	0.66	26.94	0.44	
NOCATCH	0.66	26.84	0.44	
SOMETHING	0.85	44.01	0.73	
<b>Catching Numbers</b>			0.77 <sup>b</sup>	0.53
MOREFISH	0.69	29.47	0.47	
MANYFISH	0.83	41.44	0.69	
LIMIT	0.66	28.77	0.43	
<b>Catching Large/Trophy</b>			0.69 <sup>b</sup>	0.44
BIGFISH	0.47	15.21	0.22	
CHALLENGE	0.75	30.06	0.56	
TROPHY	0.73	27.99	0.53	
<b>Keeping Fish</b>			0.83 <sup>b</sup>	0.62
EAT	0.59	25.61	0.34	
DONTKEEP	0.86	44.51	0.74	
RELEASE	0.89	51.17	0.79	

<sup>a</sup> All *t*-tests were significant at  $P < 0.001$ .

<sup>b</sup> Denotes composite reliability.

**Table 8.—Correlation matrix of the four latent factors derived from a factory analysis of sixteen statements intended to measure catch-related attitudes toward recreational fishing. Statements that make up each factor can be found in Table 7.**

<b>CONSTRUCT</b>	Catching Something	Catching Numbers	Catching Large/Trophy	Keeping Fish
Catching Something	1.00			
Catching Numbers	0.69	1.00		
Catching Large/Trophy	0.31	0.36	1.00	
Keeping Fish	0.37	0.25	-0.24	1.00

### **Discussion**

The results from the analysis suggested a final model to measure four constructs of consumptive orientation. Although the originally posited model did not provide an acceptable fit to the data, results provided some revelations based on previous research, suggesting work needs to continue towards understanding consumptive orientation. The results also have implications to those responsible for managing fishery resources and the experiences that anglers expect from going fishing.

The results varied from those in a previous attempt to confirm the factors present in the scale. Aas and Vittersø (2000) concluded the scale consisted of one “general consumptiveness” factor with several nested factors needed to complete their model. The results in this paper reflect the general consumptiveness factor; however, this factor is uniquely represented by the three items left in the final model (NOFISH, NOCATCH, and SOMETHING). Furthermore, although the “catching something” factor was highly correlated with the “catching numbers” factor, the uniqueness of the factor was demonstrated by showing discriminant validity. Study results also disagreed with their conclusions that some items need to be reworded to avoid measuring more than one

factor. Upon closer examination, the items they called into question did not appear in the original version of Graefe's (1980) scale. The confusion over the items was probably due to language differences in their sample and the lack of published literature documenting changes in the scale over the past twenty-five years.

Although the final revised model in this paper did have acceptable fit, discretion should be used in generalizing results to other populations. Since modifications were made to the original hypothesized model, the revised model could be viewed as adjustments necessary to fit the model to this particular sample (MacCallum 1986; MacCallum et al. 1992). Furthermore, it should be remembered that the population from which the sample was drawn was licensed anglers in Texas, with further modifications to the sample to include only male Anglos. If the model is to be generalized, this can only be done with similar such populations.

Results can only be generalized to similar populations from which the sample was drawn; nevertheless, they strengthen previous research that makes use of the scale. Since most of the work done with the scale is contained in agency reports, this was the first opportunity for the current scale items to be tested and discussed. For example, Sutton (2003) used a version of the scale to examine catch-and-release behavior among freshwater anglers, and concluded that an angler's attitudes were an important component of the choice an angler made when deciding to keep a fish. While the choice depends on much more than the attitude towards the behavior (Ajzen and Fishbein 1980; Ajzen 1991), this attitude was an important component in the decision to keep a fish. As expected, those anglers with a weaker attitude towards keeping fish were expected to

release caught fish when all other variables are equal. Since the scale has been used elsewhere (Fedler and Ditton 1986; Aas and Kaltenborn 1995; Graefe and Ditton 1997; Finn and Loomis 2001; Sutton and Ditton 2001), the results presented here should strengthen their conclusions drawn regarding consumptive orientation.

Previous research has generally made appropriate use of the consumptive scale. However, not all research that used the scale has identified the factors in the scale (e.g., Wilde and Ditton 1994; Gillis and Ditton 1998) or grouped scale items into factors that were incorrect (e.g., Loomis and Ditton 1987; Wilde et al. 1998; Ross and Loomis 2001) according to the results presented here. For example, some studies only reported statistics on individual scale items without recognizing the items measured underlying constructs of consumptive orientation; other studies grouped the items differently than those reported here and provided no basis for their interpretation of how the items factored into the consumptive elements. While the confusion over how to treat the scale items (i.e., ordinal vs. interval/ratio) and the presence of four distinct factors has not been well documented previously, study results provide the basis for future use of the factors. Hopefully, the use and effectiveness of the consumptive orientation scale and an understanding of its relationship to angler behavior will increase as a result.

Another premise of this paper is that the psychometric properties of the four constructs are additive. Although each individual item is measured on an ordinal scale, and should be treated as such, the creation of additive “factor scores” means the variables can now be considered continuous and appropriate statistical techniques can be used on these scores (Kass and Tinsley 1979). For instance, it is not good practice to

report a mean on each individual item since they are essentially categorical (Sirkin 1995). In other words, although the items are measured on a scale from 1 to 5, these numbers have no meaning; they could just as easily be -2 to 2, and the mean of the numbers is meaningless. However, since the range of possible scores is now three (low importance) to fifteen (high importance), reporting a mean on the additive score for “keeping fish” would have intuitive meaning. Although these scores could still be considered ordinal (the numbers do not really have any meaning), the fact that there is a wide range of scores allows for interval level measures of association to be valid (Bollen and Barb 1981).

Investigators who use the consumptive orientation scale in the future will hopefully better understand the properties of the scale based on the analysis conducted. As a result of this research and previous research (Aas and Vittersø 2000; Hunt 2000; Sutton and Ditton 2001; Sutton 2003), a sufficient body of literature exists from which hypotheses about the structure of the scale can be drawn. Much like the testing of experience preference scales has reached some conclusion in fisheries literature (Fedler and Ditton 1994), the consumptive orientation scale has been tested and should be used when examining fishing related attitudes. If future research is based on the conclusion there are four latent factors measured by the scale, then any future items designed to measure these four constructs should be tested using the CFA approaches outlined in this research. Only when a new latent factor of consumptive orientation is hypothesized (such as “playing” a fish), and new items proposed to measure the hypothesized construct, should the model tested here be modified. In this case, the researcher would

hypothesize the new latent factor would be independent of existing scale items. It is possible that any items designed to measure an additional construct would affect the current structure of the scale, requiring modification of the current model.

While most studies using the consumptive orientation scale have concentrated on the strength of consumptive attitudes, it is not understood if these attitudes are unique to recreational fishing. While the scale does concentrate on angling-related attitudes, it is possible these types of attitudes manifest themselves in other activities. Most research in this area has relied on Recreation Experience Preference scales to determine motivations applicable across activities (Manfredo et al. 1996). Whether the attitudes defined here are applicable across a wide range of activities remains to be seen. For example, although bird watching is considered a nonconsumptive activity, there is a motivation for “seeing birds” (Scott et al. 1999; Hvenegaard 2002), much like the identified factor of “catching something.” It would be expected that as these motivations are identified and grouped (i.e., seeing a specific species of bird and “catching large/trophy fish”), that activity substitutes could be identified, although previous research has suggested that there are few substitutes for specific types of fishing (Shelby and Vaske 1991).

Understanding consumptive orientation should shed some light on other recreation concepts applicable to fisheries management as well. While the results presented came from an analysis of the general angler population, it is not known how these attitudes may differ when these same anglers were placed in a different context. For example, while an angler may hold a particular set of attitudes on a fishing trip with friends, it would be expected that these attitudes would change if the same angler was

fishing with his family (Field and O'Leary 1973; Buchanan et al. 1981). Perhaps the attitude towards “catching large/trophy fish” would be greater when fishing with friends when competition to catch the biggest fish is high, but this same attitude would be weak when fishing with family and replaced with a stronger attitude towards “catching something.” Other studies have shown that attitudes change as a result of previous success (Finn and Loomis 2001), therefore it is expected that motivations would be different based on situational variables.

It is not known how survey timing affected responses to the consumptive orientation scale. Data for this analysis came from a statewide survey asking anglers about their general fishing experiences. If a person had not been fishing recently, their attitudes may not have been clear when responding to scale items. Timing of responses has been shown to affect satisfaction ratings (Hull et al. 1992; Stewart and Hull 1992), and it may be just as important in determining angler responses to the consumptive orientation scale items. As in satisfaction research, it can be hypothesized that anglers may adjust their attitudes based on the actual experience from the fishing trip. In other words, if an angler did not catch any fish, they might be expected to report a lower score for “catching something” to compensate for their lack of success. These problems can be resolved by asking anglers about their consumptive attitudes both before and after a specific fishing trip as has been done in previous studies of hikers (Hull et al. 1992; Stewart 1992; Stewart and Hull 1992).

Future research should continue to make use of the sixteen items reported in this paper. While four of the items were shown to be insignificant in the overall model

structure, they could prove useful in testing the model in populations other than the one used here. Furthermore, this paper hypothesized only one original model. An effort was made to test the model used by Aas and Vittersø (2000), but the items were so different that competing models could not be developed. A competing model could be tested against the model proposed here using a nested models approach (Anderson and Gerbing 1988).

Overall, I found at least four independent attitudes that anglers can hold towards the catch-related aspects of fishing. Hopefully the paper will help continue the dialog on the activity-specific experience preferences of recreational anglers. The dialog should include how the consumptive orientation concept and associated subdimensions fit into other theories dealing with recreational fishing. For example, it has been hypothesized that consumptive orientation is an important indicator of specialization level (Ditton et al. 1992). Based on the results presented here, it would be useful to examine if consumptive attitudes vary as expected among fishing social worlds. These preferences should be more useful to managers for determining angler wants and needs than the activity-general items usually reported in the literature as being more important motivators for anglers. After all, catching fish is an integral part of the angling experience and without an understanding of the related motivations, the overall recreational fishing experience will not be well understood from a service delivery standpoint.



### CHAPTER III

## EXPLORING WOMEN'S ATTITUDES TOWARDS THE CATCH-RELATED ASPECTS OF RECREATIONAL FISHING

### **Introduction**

Understanding the breadth of angler social worlds as well as differences among social worlds is important if fishery managers are to produce benefits for all stakeholders. One of the most obvious but often overlooked angler social worlds is women. Though gender differences have been the topic of many leisure research efforts (Kellert and Berry 1987; Jackson 1988; Jackson and Henderson 1995; Shinew et al. 1995; Philipp 1997; Toth and Brown 1997; Wiley et al. 2000), little, if any, work has been done to explore whether this sub-population has the same attitudes towards catching fish as do men. Thus, the purpose of this chapter is to assess whether a scale designed to measure angler attitudes towards the catch-related aspects of fishing is applicable and reliable for women.

Studies point to gender differences in the types as well as frequency of participation in these activities. For example, although a relatively small percentage (8%) of all women participated in fishing, they made up 26% of all anglers (compared to 25% of males in the U.S. participating in fishing, and 74% of all anglers; USDI and USFWS 2002). In 1996, about 9% of all women participated in fishing constituting 27% of all anglers (USDI and USFWS 1997). Frequency of participation was less for women as well; women fished less when compared to all anglers (12 days vs. 16 days), and

made fewer fishing trips when compared to all anglers (9 trips vs. 13 trips; Henderson 2004). In contrast, women made up the majority (54%) of wildlife watchers in the U.S. in 2001 and had higher rates of participation than men (31% of women participated compared to 28% of men; USDI and USFWS 2002).

There are several possible explanations why women participate in some outdoor recreation activities more than other activities. From a societal standpoint, gender roles, lack of opportunity, peer approval, and self-concept concerns are some of the main reasons that young girls are not socialized into participating in outdoor recreation (Culp 1998). These constraints are even more pronounced for consumptive activities like hunting and fishing (Connelly et al. 1996) and in outdoor recreational activities that usually take place in “wild,” natural settings, often leading to a sense of fear among women (Virden and Walker 1999). Gender has also been shown to affect attitudes toward wildlife (Kellert and Berry 1987), suggesting that the nature of the activity influences whether or not women choose to participate in certain activities. For example, women may not choose to participate in deer hunting because of their affective feelings towards deer (i.e., the “Bambi” syndrome). Furthermore, society has mandated previously that particular activities may not be “appropriate” for women (Wiley et al. 2000). This leads to a general conclusion that many women are constrained from participating in certain outdoor recreational activities (like fishing), which may also influence the attitudes women hold toward that activity.

Anglers are motivated to participate in recreational fishing for a variety of reasons. Some of these reasons are general to participating in an outdoor recreational

activity (e.g., getting away from the regular routine can be experienced in a variety of activities). Other reasons are specific to recreational angling (e.g., for the experience of the catch). Early work suggested that anglers are motivated by four fundamental factors: temporary escape, achievement, exploration, and experiencing natural surroundings (Knopf et al. 1973). All of these are activity-general; in other words, they can be and are experienced regularly in other outdoor recreation activities. Among activity-specific motivations, Fedler and Ditton (1994) examined a total of five different studies of freshwater and saltwater angling populations and reported that “for the challenge or sport of fishing,” “for the experience of the catch,” and “to obtain a trophy fish” were of low importance for at least two of the five populations. They found that “to obtain fish for eating” was important in one of the saltwater population studies. Among a total of twelve sub-population studies they examined, these four reasons were found to be of higher importance. This led to the conclusion that motivation studies must take into account the population under investigation, with studies of the more diverse general population often obscuring the importance of activity-specific motivations (Fedler and Ditton 1994). Given previous perspectives on the particular importance of gender as a defined sub-population (Henderson et al. 1996), the results of Fedler and Ditton (1994) are important as researchers study such sub-populations as women.

#### *Consumptive Orientation*

Although the measurement and importance of fishing motivations have been well documented, the catch-related aspects of recreational fishing are far less well understood. Labeling these aspects as consumptive orientation, Graefe (unpublished

data) proposed twenty-one items designed to measure two dimensions of the catch experience: catch and keep. He concluded that only nine of the twenty-one items were useful for further analysis. Graefe (1980) further refined the scale he designed by adding six items and proposed the scale measured four dimensions of the catch experience: number of fish caught, type of fish caught, disposition of catch, and general orientation to catching something. However, after using factor analysis on a sample of registered boat anglers in Texas, he concluded the scale measured six domains of consumptive orientation: number of fish caught, disposition of fish caught, general orientations towards catching something, and three aspects related to the type of fish (catching big fish, trophy fish, and challenging game fish). Presently, the scale consists of sixteen items, which are hypothesized to measure four attitudes towards catching fish: catching something, retaining fish (as opposed to releasing), catching large fish (size), and catching large amounts of fish (numbers).

One previous attempt to validate the consumptive orientation scale yielded mixed results. Aas and Vittersø (2000) used the original sixteen items published in Graefe (1980) to confirm the measurement of consumptive orientation. They used an early version of the scale rather than a current version of the scale. Furthermore, Aas and Vittersø (2000) used a sample composed of Scandinavian anglers necessitating a change in wording and scale items to accommodate language and cultural differences. This could have affected their conclusions regarding the number of constructs present and that some of their items measured more than one attitude (e.g., “Catching large fish is not important, more important is to catch fish for food”). Also, it is possible that other

cultures view the catch-related aspects of recreational fishing differently than the traditional fishing clientele of white, Anglo males that dominate angler samples in the United States, and who may assign different values to their fishing experience (Hunt 2000). Female anglers could be considered a unique culture (Henderson 1994), thus providing the impetus for this paper.

Regardless of whether women hold different attitudes towards the expected outcomes of recreational fishing (Fedler 2000), the basic structure of the consumptive orientation scale is not expected to differ. In spite of the extent of motivation to participate in a given leisure activity, the structure of most leisure activities should be similar regardless of gender (Toth and Brown 1997). In other words, the act of going fishing should provide the same physical experiences for women as it does for men (i.e., women do not “fish differently” than men). However, this does not mean there are not gender differences among the importance of psychological experiences involved in recreational fishing. The population of women anglers may place more importance on the social aspects of going fishing (i.e., being with family) and not necessarily on the act of catching fish itself. In previous investigations of hunting, women were as achievement oriented as males, but placed more importance on the aesthetic and social aspects of their hunting experience than males (Jackson 1988; Adams and Steen 1997). Furthermore, although some of the benefits derived from participating in a leisure activity differ among men and women (Philipp 1997), the ability of the consumptive orientation scale to measure the four hypothesized fishing specific attitudes should be the same across gender.

Other variables related to gender may affect the structure of the consumptive orientation scale. Research suggests that previous experience with an activity affects the structure of motivations for participating in that activity (Williams et al. 1990). For instance, as people become more personally involved with an activity through having more experience, they are able to make specific choices as to what motivates them to participate in an activity (Schreyer et al. 1984; Hammitt et al. 1989). Less experienced anglers may report they are going fishing “because it’s fun,” while more experienced anglers would be expected to report specific motivations as to what makes the experience enjoyable. Consequently, less experienced anglers may not be as aware of their underlying motivations for participating in fishing and thus may not exhibit the same factor structure as more experienced anglers. This may affect the results of the consumptive orientation scale when examined in the context of gender. In Texas, female anglers were less experienced than males when measured by years of experience in fishing and self-reported skill level (Ditton and Hunt 1996). According to Williams et al. (1990), less experienced anglers are expected to exhibit fewer factors when examining motivations for participating in fishing because they do not have the necessary personal experience with the activity to make distinct choices as to what motivates them to participate. Nevertheless, this paper only examined the factor structure of the consumptive orientation scale for women; if differing factor structures were found, future research can be directed controlling for experience.

## Methods

Data for the analysis came from a statewide survey of licensed angler in Texas conducted in the spring of 2002. The sampling frame consisted of anglers that purchased a resident fishing license in FY 2001 (September 1, 2000—August 31, 2001). Overall, 10,000 anglers were included in the sample.

An 11-page questionnaire was administered to the sample of Texas anglers. Questions were developed to assess anglers' behaviors, attitudes, preferences for fisheries management practices, and demographics. A modified version of the scale originally developed by Graefe (1980) was used to measure anglers' level of consumptive orientation. The scale consisted of sixteen items designed to measure different sub-dimensions of the consumptiveness concept. Respondents were asked to indicate whether they agreed or disagreed with each of the items on a 5-point agreement continuum ranging from "Strongly Disagree" to "Strongly Agree." Four of the items were reverse coded for analysis purposes so a higher additive score on each of the proposed subdimensions should indicate stronger positive attitudes for that subdimension (i.e., a higher score on the keep subdimension means that an angler has stronger positive attitudes towards keeping fish).

Mailing procedures followed those of Salant and Dillman (1994). Excluding non-deliverable questionnaires ( $n = 1,666$ ), an effective response rate of 40% was achieved. Completed surveys were received from 3,302 license holders; of this number 162 were not completed by the person to whom the questionnaire was mailed, two were screened out because of age requirements ( $\geq 18$ ), and 14 were screened out for various

reasons (e.g., skeptical of government). Additionally, 494 license holders indicated they did not fish since this time last year; they were dropped from further analysis.

The response rate was low when compared to previous statewide mail surveys in Texas. While most of these surveys have achieved response rates in the sixtieth percentile, the past two have fallen below fifty percent (Anderson and Ditton 2004). This is not just a trend in the Texas survey, declining response rates and possible reasons have been reported elsewhere (Connelly et al. 2003). Nevertheless, sufficient sample size was available to complete the theoretical analysis presented below. Also, there was no intent to generalize results to the statewide population and hence a non-respondent check was not deemed necessary.

### *Analysis*

An exploratory factor analysis (EFA) was used to investigate if the consumptive orientation scale was adequate for measuring women's attitudes toward the catch-related aspects of fishing. This technique was used to identify the common factors underlying a set of observed variables (Kim and Mueller 1978b; Kass and Tinsley 1979; Hatcher 1994). A major assumption was that the observed variables were measured on an interval/ratio scale (Kim and Mueller 1978a; Hatcher 1994). Although some researchers posit that scale items with as few as five scale points can be considered interval scale data (Bollen and Barb 1981), the techniques performed in this analysis used the estimation of the polychoric correlation matrix, which is more appropriate for ordinal level data (Jöreskog 1994). The polychoric correlation matrix assumes there is an



underlying continuous variable,  $z^*$ , of the ordinal variable  $z$ , which is normally distributed (Jöreskog 1994).

Another assumption was that the data exhibited both univariate and bivariate normality. These assumptions were tested using procedures outlined by D'Agostino et al. (1990) to check for univariate normality and the RMSEA test statistic produced by PRELIS 2.54 (Jöreskog and Sörbom 1996b) for bivariate normality.

Once the polychoric correlation matrix was derived, a common factor analysis was performed using squared multiple correlations as the communality estimate. Once the number of factors was determined, an oblique rotation was used to determine the nature of the factors. Oblique rotation was used because it was thought the factors would correlate with each other since they were dealing with the same overall concept, and if they were not correlated, the oblique and orthogonal solutions would be similar. All EFA analyses were conducted using the PROC FACTOR procedure in The SAS System for Windows © version 8.2 (SAS Institute 2000).

A number of procedures were used to decide the number of factors to be retained. While some researchers have used the eigenvalue greater than one rule (Kaiser 1960) or an examination of the scree plot (Cattell 1966), a combination of these were used as well as parallel analysis (Horn 1965), whereby the eigenvalues from the data were compared to eigenvalues from a number of random data sets, and the correct number of factors was given when the two plots cross; the rationale being that a factor was meaningful if the variance extracted was greater than what one would expect from

random data. The random data eigenvalues were generated with procedures outlined by O'Connor (2000), using the equations given by Montanelli and Humphreys (1976).

### **Results**

There were 306 usable cases available for the EFA. The distribution of excluded cases was as follows: male ( $n = 2,201$ ); non-white female anglers ( $n = 86$ ) (because of how various subcultures may influence attitudes toward recreational fishing; Hunt 2000); and either missing entire response sets, incomplete scale responses, or item response sets ( $n = 37$ ).

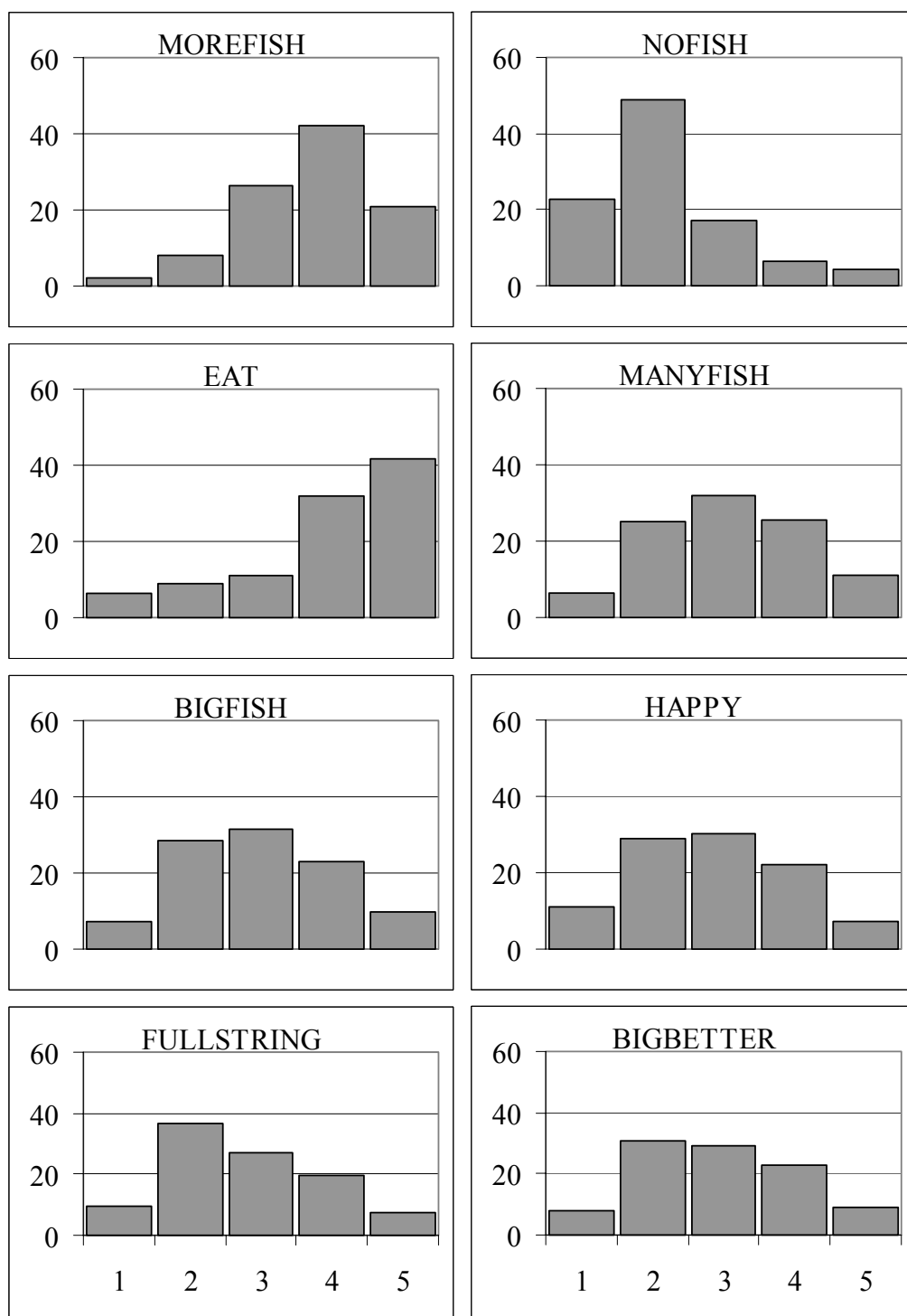
Descriptive statistics for angler responses are presented in Table 9, along with basic frequencies in Figure 4. Univariate skewness was marginally normal (range = -1.05 to 0.99) as was univariate kurtosis (range = 2.1 to 3.8). Bivariate normality was accepted at the 0.05 level for all pairs of variables; RMSEA statistics ranged from 0 to 0.1, with 0.1 being the recommended upper bound to show bivariate normality (Jöreskog 2002). The polychoric correlation matrix is presented in Table 10. The table is included so that future research efforts can replicate the present study, which is essential if the body of knowledge related to consumptive orientation is to expand (Kass and Tinsley 1979; Boomsma 2000). A cursory examination of the table provided some interesting correlations among items. The top five bivariate correlations were for the items DONTKEEP and RELEASE (0.82), NOCATCH and SOMETHING (0.72), FULLSTRING and MANYFISH (0.70), HAPPY and NOFISH (0.69), and NOFISH and SOMETHING (0.61). Overall there were strong relationships ( $r > 0.5$ ) for 23 of the possible 156 pairs of variables (15%).

**Table 9.—Descriptive statistics of responses by female, Anglo anglers to statements intended to measure catch-related attitudes toward recreational fishing. The scale for attitudinal measurement is: 1 – strongly disagree; 2 – disagree; 3 – neutral; 4 – agree; 5 – strongly agree.**

STATEMENTS OF FEELINGS		Mean	St. Dev.	Skewness ( $\sqrt{B_1}$ )	Kurtosis ( $B_2$ )	$K^2$
MOREFISH	The more fish I catch, the happier I am	3.71	0.96	-0.57	3.03 <sup>b</sup>	15.31
NOFISH	A fishing trip can be successful even if no fish are caught <sup>a</sup>	2.20	1.00	0.99	3.80	43.49
EAT	I usually eat the fish I catch	3.93	1.21	-1.05	3.12 <sup>b</sup>	42.16
MANYFISH	A successful fishing trip is one in which many fish are caught	3.10	1.09	0.03 <sup>b</sup>	2.26	17.35
BIGFISH	I would rather catch 1 or 2 big fish than 10 smaller fish	3.00	1.09	0.13 <sup>b</sup>	2.27	16.90
HAPPY	When I go fishing, I am just as happy if I don't catch fish <sup>a</sup>	2.85	1.11	0.12 <sup>b</sup>	2.26	18.17
FULLSTRING	A full stringer is the best indicator of a good fishing trip	2.78	1.09	0.33	2.33	17.54
BIGBETTER	The bigger the fish I catch, the better the fishing trip	2.94	1.11	0.16 <sup>b</sup>	2.22	21.92
DONTKEEP	I'm just as happy if I don't keep the fish I catch <sup>a</sup>	2.67	1.20	0.36	2.12	39.15
LIMIT	I'm happiest with a fishing trip if I catch at least the limit	2.92	1.05	0.17 <sup>b</sup>	2.32	14.20
WANTKEEP	I want to keep all the fish I catch	2.34	1.13	0.69	2.74 <sup>b</sup>	22.11
CHALLENGE	I'm happiest with the fishing trip if I catch a challenging game fish	2.96	1.12	0.08 <sup>b</sup>	2.31	14.17
RELEASE	I'm just as happy if I release the fish I catch <sup>a</sup>	2.66	1.21	0.32	2.13	37.04
NOCATCH	If I thought I wouldn't catch any fish, I wouldn't go fishing	2.34	1.19	0.81	2.74 <sup>b</sup>	28.25
TROPHY	I like to fish where I know I have a chance to catch a "trophy" fish	2.51	1.11	0.41	2.45	14.96
SOMETHING	When I go fishing, I'm not satisfied unless I catch at least something	2.85	1.16	0.11 <sup>b</sup>	2.10	36.89

<sup>a</sup> Item reverse coded for analysis purposes.

<sup>b</sup> Not significant at the 0.05 level.



**Figure 4.—Frequency distributions of responses by female, Anglo anglers to statements intended to measure catch-related attitudes toward recreational fishing. Statements can be found in Table 9. The scale for attitudinal measurement is: 1 – strongly disagree; 2 – disagree; 3 – neutral; 4 – agree; 5 – strongly agree.**

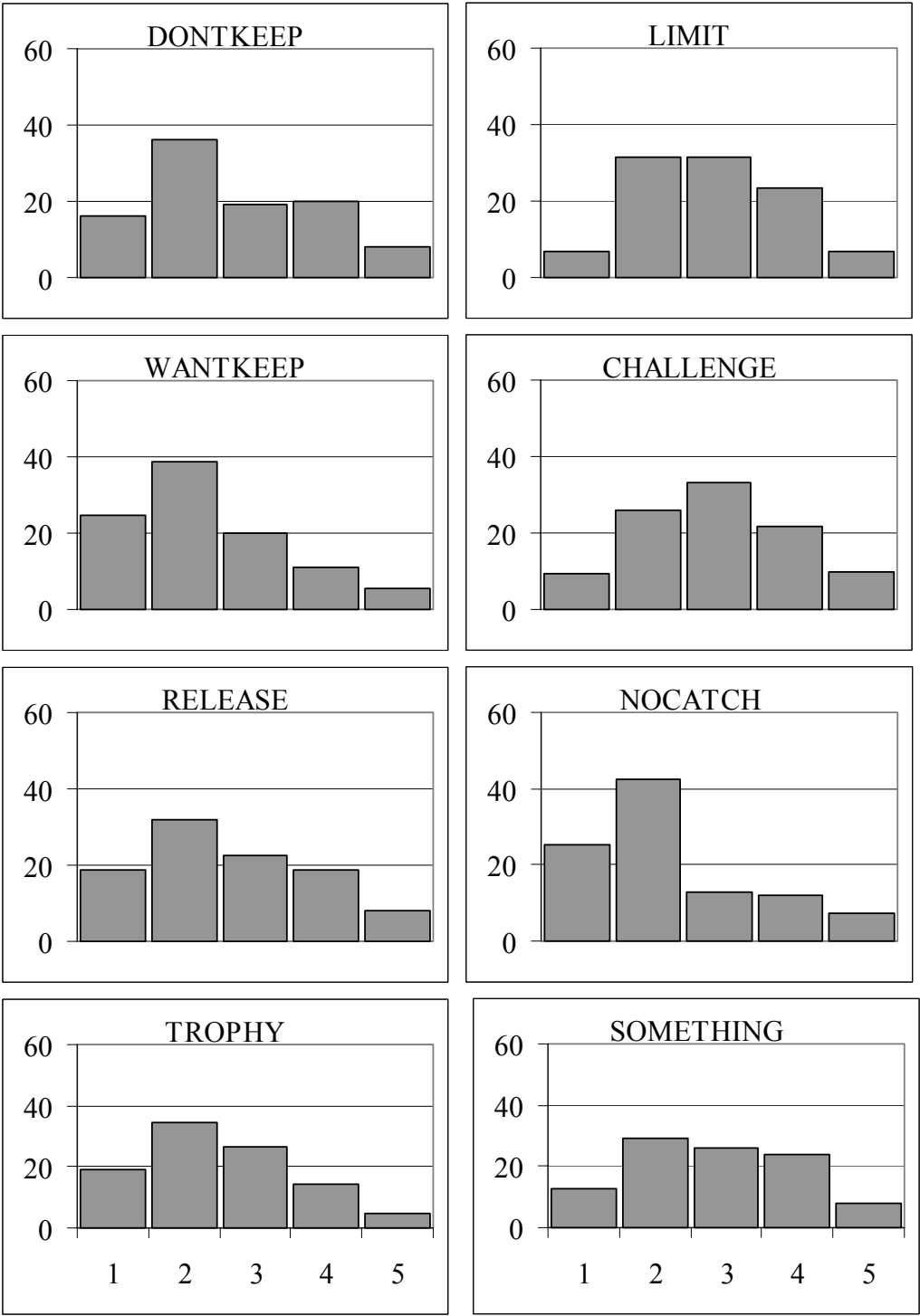


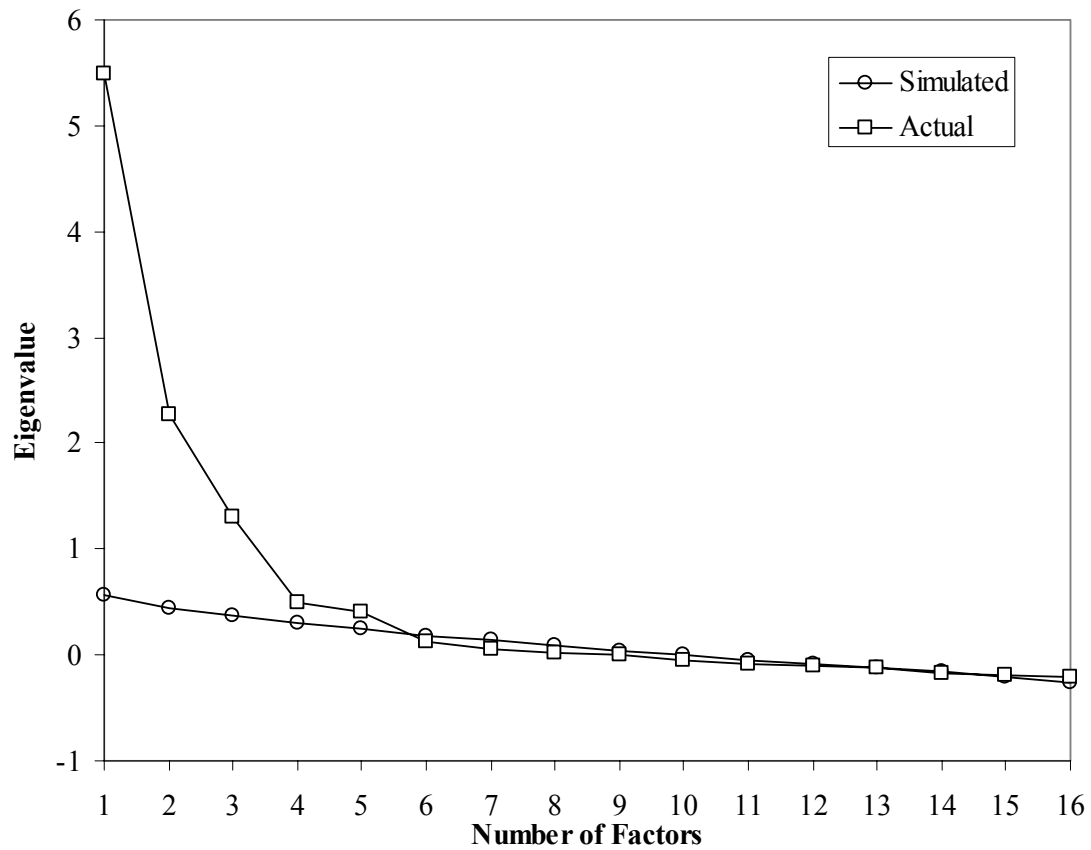
Figure 4.—Continued.

**Table 10.—Polychoric correlation matrix of responses by female, Anglo anglers to statements intended to measure catch-related attitudes toward recreational fishing. Statements can be found in Table 9.**

	MORE FISH	NO FISH	EAT	MANY FISH	BIG FISH	HAPPY	FULL STRING	BIG BETTER	DONT KEEP	LIMIT	WANT KEEP	CHAL LENGE	RELEASE	NO CATCH	SOME TROPHY	THING
MOREFISH	1.00															
NOFISH	0.36	1.00														
EAT	0.07	-0.05	1.00													
MANYFISH	0.55	0.49	0.14	1.00												
BIGFISH	0.14	0.15	0.04	0.24	1.00											
HAPPY	0.36	0.69	-0.08	0.44	0.06	1.00										
FULLSTRING	0.44	0.44	0.24	0.70	0.24	0.30	1.00									
BIGBETTER	0.38	0.27	0.07	0.55	0.58	0.26	0.60	1.00								
DONTKEEP	0.08	0.28	0.53	0.26	0.02	0.39	0.24	0.05	1.00							
LIMIT	0.37	0.38	0.18	0.57	0.20	0.34	0.57	0.51	0.20	1.00						
WANTKEEP	0.13	0.17	0.54	0.33	0.08	0.19	0.32	0.21	0.57	0.34	1.00					
CHALLENGE	0.29	0.06	0.03	0.31	0.39	0.04	0.36	0.54	-0.22	0.41	0.03	1.00				
RELEASE	0.12	0.29	0.50	0.26	0.12	0.43	0.27	0.15	0.82	0.27	0.58	-0.11	1.00			
NOCATCH	0.34	0.56	0.21	0.47	0.10	0.53	0.48	0.28	0.33	0.44	0.38	0.14	0.38	1.00		
TROPHY	0.20	0.13	0.02	0.32	0.35	0.16	0.34	0.44	-0.08	0.34	0.09	0.57	0.02	0.30	1.00	
SOMETHING	0.42	0.61	0.05	0.54	0.16	0.60	0.55	0.43	0.31	0.51	0.32	0.25	0.36	0.72	0.41	1.00

An examination of the eigenvalues associated with each of the variables suggested three factors present in the scale. The scree plot suggested three factors as well. When the plot of the eigenvalues was compared to that of random data (Figure 5), the plot showed that five factors should be extracted. Since extracting too few or too many factors can be problematic (Turner 1998), a decision was made to examine the rotated factor structure using three, four, and five factors (Tables 11 - 13). Significant loadings were identified as those over 0.3; loadings used in interpretation of the factor were those over 0.4 (Stevens 2002).

The three factor and five factor solutions provided marginally acceptable results because of the interpretation of the resulting factor structures. In order for each variable to display simple structure (Hatcher 1994), variables had to be dropped from interpretation for the three and five factor solutions. For the three factor solution, MANYFISH loaded significantly on the interpretation of Factor One and Factor Two. For the five factor solution, CHALLENGE, NOCATCH, TROPHY, and SOMETHING loaded significantly on more than one factor as well. The four factor solution provided the simplest interpretation of factors; no variable loaded significantly on more than one factor. Although the scree test and eigenvalue greater than one rule indicated a three factor solution, and the parallel analysis suggested a five factor solution, four factors provided the most interpretable results based on familiarity with the scale and associated literature (Hakstian et al. 1982; Hatcher 1994; Preacher and MacCallum 2003).



**Figure 5.—Plot of actual eigenvalues from common factor analysis on sixteen observed variables intended to measure catch-related attitudes toward recreational fishing versus plot of simulated random data eigenvalues generated with procedures outlined by O'Connor (2000).**



Table 11.—Factor loadings from the rotated factor pattern matrix and factor structure matrix for a three factor solution. Data were from responses by female, Anglo anglers to sixteen statements intended to measure catch-related attitudes toward recreational fishing. Statements can be found in Table 9. Decimals have been omitted; items in bold were used for interpretation of the factor. The statistic  $h^2$  denotes final communality estimates.

Item	Factor Pattern			Factor Structure			$h^2$
	1	2	3	1	2	3	
MOREFISH	<b>42<sup>a</sup></b>	28	-08	50	44	14	32
NOFISH	<b>88<sup>a</sup></b>	-08	-13	79	24	23	64
EAT	-34 <sup>a</sup>	15	<b>80<sup>a</sup></b>	06	13	68	55
MANYFISH	<b>47<sup>a</sup></b>	<b>42<sup>a</sup></b>	08	67	62	34	61
BIGFISH	-11	<b>57<sup>a</sup></b>	05	13	54	08	30
HAPPY	<b>89<sup>a</sup></b>	-17	-07	79	16	29	66
FULLSTRING	33 <sup>a</sup>	<b>51<sup>a</sup></b>	17	59	66	37	59
BIGBETTER	10	<b>76<sup>a</sup></b>	03	41	80	18	65
DONTKEEP	18	-24	<b>81<sup>a</sup></b>	43	-06	85	78
LIMIT	31 <sup>a</sup>	<b>46<sup>a</sup></b>	14	54	59	33	49
WANTKEEP	00	12	<b>70<sup>a</sup></b>	34	21	72	53
CHALLENGE	-10	<b>78<sup>a</sup></b>	-14	14	72	-07	56
RELEASE	18	-12	<b>78<sup>a</sup></b>	46	06	84	73
NOCATCH	<b>65<sup>a</sup></b>	08	13	73	34	42	56
TROPHY	07	<b>61<sup>a</sup></b>	-09	26	62	02	40
SOMETHING	<b>74<sup>a</sup></b>	18	00	81	47	34	69

<sup>a</sup> Indicates significant loading.

Table 12.—Factor loadings from the rotated factor pattern matrix and factor structure matrix for a four factor solution. Data were from responses by female, Anglo anglers to sixteen statements intended to measure catch-related attitudes toward recreational fishing. Statements can be found in Table 9. Decimals have been omitted; items in bold were used for interpretation of the factor. The statistic  $h^2$  denotes final communality estimates.

Item	Factor Pattern				Factor Structure				$h^2$
	1	2	3	4	1	2	3	4	
MOREFISH	21	-10	<b>53<sup>a</sup></b>	-03	37	10	57	31	36
NOFISH	<b>76<sup>a</sup></b>	-11	20	-05	79	21	43	20	65
EAT	-38 <sup>a</sup>	<b>77<sup>a</sup></b>	21	-04	-03	67	22	04	57
MANYFISH	22	05	<b>68<sup>a</sup></b>	01	49	29	78	44	66
BIGFISH	01	09	-21	<b>76<sup>a</sup></b>	10	08	25	64	44
HAPPY	<b>84<sup>a</sup></b>	-03	02	01	83	28	33	17	70
FULLSTRING	08	13	<b>68<sup>a</sup></b>	08	40	32	79	49	65
BIGBETTER	05	04	25	<b>63<sup>a</sup></b>	27	14	64	79	67
DONTKEEP	21	<b>81<sup>a</sup></b>	-10	-08	46	87	12	-07	79
LIMIT	13	11	<b>52<sup>a</sup></b>	14	39	29	68	47	50
WANTKEEP	-07	<b>68<sup>a</sup></b>	22	-01	26	70	34	13	53
CHALLENGE	-16	-14	27	<b>58<sup>a</sup></b>	00	-11	51	70	57
RELEASE	25	<b>80<sup>a</sup></b>	-17	10	49	85	16	08	78
NOCATCH	<b>49<sup>a</sup></b>	13	36 <sup>a</sup>	-05	66	39	54	25	56
TROPHY	05	-07	14	<b>55<sup>a</sup></b>	17	-01	45	64	42
SOMETHING	<b>59<sup>a</sup></b>	01	34 <sup>a</sup>	09	74	31	62	40	69

<sup>a</sup> Indicates significant loading.

**Table 13.—Factor loadings from the rotated factor pattern matrix and factor structure matrix for a five factor solution. Data were from responses by female, Anglo anglers to sixteen statements intended to measure catch-related attitudes toward recreational fishing. Statements can be found in Table 9. Decimals have been omitted; items in bold were used for interpretation of the factor. The statistic  $h^2$  denotes final communality estimates.**

Item	Factor Pattern					Factor Structure					$h^2$
	1	2	3	4	5	1	2	3	4	5	
MOREFISH	-12	17	<b>60<sup>a</sup></b>	-03	-06	11	35	59	25	25	38
NOFISH	-12	<b>74<sup>a</sup></b>	24	-04	-01	22	78	47	18	12	66
EAT	<b>78<sup>a</sup></b>	-37 <sup>a</sup>	12	-04	06	68	-04	20	-01	15	58
MANYFISH	03	16	<b>80<sup>a</sup></b>	01	-11	30	47	82	38	32	71
BIGFISH	07	-02	-06	<b>71<sup>a</sup></b>	04	07	09	28	68	10	47
HAPPY	-04	<b>83<sup>a</sup></b>	04	02	03	28	83	37	17	06	70
FULLSTRING	12	04	<b>72<sup>a</sup></b>	06	02	33	37	80	39	41	66
BIGBETTER	01	01	39 <sup>a</sup>	<b>58<sup>a</sup></b>	03	14	25	67	76	32	71
DONTKEEP	<b>81<sup>a</sup></b>	20	-04	-05	-14	86	48	16	-02	-13	80
LIMIT	12	12	<b>46<sup>a</sup></b>	11	18	30	36	68	36	44	51
WANTKEEP	<b>69<sup>a</sup></b>	-06	12	-02	11	71	25	34	07	20	54
CHALLENGE	-12	-13	14	<b>49<sup>a</sup></b>	<b>40<sup>a</sup></b>	-10	-05	48	58	53	59
RELEASE	<b>79<sup>a</sup></b>	24	-15	12	-03	85	51	20	11	-06	78
NOCATCH	16	<b>54<sup>a</sup></b>	09	-09	<b>43<sup>a</sup></b>	40	62	52	10	47	64
TROPHY	-04	10	-12	<b>45<sup>a</sup></b>	<b>56<sup>a</sup></b>	01	12	41	49	56	50
SOMETHING	04	<b>63<sup>a</sup></b>	11	04	<b>43<sup>a</sup></b>	33	70	61	25	50	74

<sup>a</sup> Indicates significant loading.

The distribution and interpretation of the four factor solution was as follows.

The first factor was labeled “attitudes towards catching something.” Items that represented this factor were “A fishing trip can be successful even if no fish are caught,” “When I go fishing, I am just as happy if I don’t catch fish,” “If I thought I wouldn’t catch any fish, I wouldn’t go fishing,” and “When I go fishing, I’m not satisfied unless I catch at least something.” The second factor was labeled “attitudes towards keeping fish.” Items influenced by this factor included “I usually eat the fish I catch,” “I’m just as happy if I don’t keep the fish I catch,” “I want to keep all the fish I catch,” and “I’m

just as happy if I release the fish I catch.” The third factor was labeled “attitudes towards catching numbers of fish.” Items that characterized this factor were “The more fish I catch, the happier I am,” “A successful fishing trip is one in which many fish are caught,” “A full stringer is the best indicator of a good fishing trip,” and “I’m happiest with a fishing trip if I catch at least the limit.” The fourth factor was labeled “attitudes towards catching large/trophy fish.” Items that characterized this factor included “I would rather catch 1 or 2 big fish than 10 smaller fish,” “The bigger the fish I catch, the better the fishing trip,” “I’m happiest with the fishing trip if I catch a challenging game fish,” and “I like to fish where I know I have a chance to catch a “trophy” fish.”

An examination of the inter-factor correlations revealed how factors were related (Table 14). Vaske et al. (2002) noted that the interpretation of correlations is a value judgment and they provided a classification scheme to assist in the interpretation of the practical significance of these correlations. Using this classification scheme, “catching something” is “typically” related with both “keeping fish” ( $r = 0.31$ ) and “catching numbers” ( $r = 0.37$ ) and had a “minimal” relationship with “catching large/trophy fish” ( $r = 0.18$ ). “Keeping fish” had a “minimal” relationship with “catching numbers” ( $r = 0.23$ ) and almost none with “catching large/trophy fish” ( $r = 0.04$ ). “Catching numbers” is “substantially” related to “catching large/trophy fish” ( $r = 0.57$ ). Alpha reliabilities were acceptable (.75 to .83) and could not have been increased by dropping any of the variables from their respective factors.

**Table 14.—Inter-factor correlations of the factors derived from an exploratory factor analysis of data from responses by female, Anglo anglers to sixteen statements intended to measure catch-related attitudes toward recreational fishing. An explanation of the factors is given in the Results section. Alpha reliabilities are on the diagonal.**

<b>Factor</b>	Catching Something	Keeping Fish	Catching Numbers	Catching Large/Trophy
Catching Something	(0.83)			
Keeping Fish	0.37	(0.81)		
Catching Numbers	0.37	0.23	(0.79)	
Catching Large/Trophy	0.18	0.04	0.57	(0.75)

### **Discussion**

Results supported the idea that the consumptive orientation scale measures four distinct attitudes toward the fishing experience. Since interpretation of factor structure was somewhat researcher driven, this discussion begins with an explanation of the reasoning for the four factor solution. This is followed by possible reasons for some indiscrepancies in results and an outline of future research needs to further understand how gender may affect consumptive orientation.

Although tests for the number of factors in women's attitudes towards the catch-related aspects of fishing suggested as few as three factors and as many as five, a four-factor solution provided the best overall results when interpretability was considered. Among the reasons why tests pointed towards a three or five factor solution could be that limited experience with the activity has affected respondents' ability to indicate the strength of their attitudes (Williams et al. 1990). Given that women in Texas, and likely elsewhere as well, were less experienced than men in terms of years of fishing and self-reported skill level (Ditton and Hunt 1996), this relative lack of experience may have affected women in the sample in making the clear choices necessary for the factor

structure to be precise. Although the three and five factor solutions provided some defensible results, other studies have shown that four factors provides a statistically reliable measurement (Sutton and Ditton 2001; Sutton 2003). A closer examination of the three factor solution would have produced a solution that identified a “general orientation towards keeping fish” factor, and resulted in splitting three items from the “catching numbers” factor (identified in the four-factor solution) into a “general orientation towards catching something” factor, and a “general orientation towards catching many large fish” factor. A five factor solution would have retained a “keeping fish” factor, a “catching something” factor, a “catching numbers” factor, a large fish factor, and an uninterpretable factor with a combination of items related to catching something and catching large fish. Similar results were reported previously where a factor solution was shown consisting of a general orientation towards catching large fish, catching something, and keeping fish, with a general “consumptiveness” factor influencing all three (Aas and Vittersø 2000).

Once the four factor solution was interpreted, the factors were expected to exhibit some correlation since they were measuring the overall concept of consumptive orientation. Most correlations were in the expected strength and direction; however, “catching large/trophy fish” exhibited almost no correlation with “keeping fish.” From a specialization perspective (Bryan 1977; Ditton et al. 1992), those anglers with favorable attitudes towards catching large fish would not be expected to show interest in retaining them (i.e., the conservation ethic); accordingly, the structure was expected to show a negative correlation between these two factors. One explanation was that the sample of

women in this study did not include enough high specialization anglers for this pattern to emerge. As mentioned previously, women were less experienced in fishing as a group and hence less socialized into the activity than men, which may have affected the relationship between these two factors. Although years of experience by itself is not a useful predictor of specialization level (Scott and Shafer 2001), previous research has shown that females differ from males on activity-specific measures of motivation; however, as years of experience increase, these differences diminish (Bohnsack 2002). If the sample consisted of more high specialization women anglers, the correlation between “catching large/trophy fish” and “keeping fish” would likely be negative and larger, as was the case for male anglers in Chapter II. Another explanation was that women were achievement oriented and measured their ability as anglers by catching and keeping large fish in order to demonstrate their prowess in the male dominated fishing social world.

An examination of frequency distributions to individual scale items showed women anglers may not have consistent attitudes towards the four factors. For example, although women generally disagreed with three of the statements related to “keeping fish” (“I want to keep all the fish I catch,” “I’m just as happy if I release the fish I catch,” and “I’m just as happy if I don’t keep the fish I catch”), there was strong agreement to the statement “I usually eat the fish I catch.” Eating fish could have been considered a social aspect of the fishing experience, which women generally ranked higher than their male counterparts (Toth and Brown 1997). There was also some disagreement in responses to items pertaining to “catching something,” with statements

“When I go fishing, I’m just as happy if I don’t catch fish” and “When I go fishing, I’m not satisfied unless I catch at least something” exhibiting somewhat normal distributions. The other two statements in this factor received fairly strong disagreement. Perhaps since women are more likely to be fishing in social groups than men (Ditton and Hunt 1996), they have interpreted these statements in a social group context and perceived their happiness based on the success of the entire group (Buchanan et al. 1981).

Consumptive attitudes may provide some of the many constraints women must overcome before participating in the social world of fishing. Although certain constraints, such as gender roles, lack of opportunity, peer approval, and self concept, have also been shown to constrain young women from participating in outdoor recreation (Culp 1998), it is not known how motivations for an activity might constrain involvement. The attitudes studied here would be considered intrapersonal constraints (Crawford et al. 1991), and could keep women from participating based on their perceived skill level and ability for overcoming their constraints. For example, a woman angler may have a strong attitude towards “catching something,” but feels she does not have the requisite skills to catch a fish. She may be constrained from even trying based on the strength of her attitude and perceived skill level. If this same angler had a weak attitude towards “catching something,” she might be more likely to go fishing. Helping women to overcome these personal constraints could play a major role in recruiting and retaining women interested in fishing (Fedler and Ditton 2001).

Results supported the use of the consumptive orientation scale for measuring attitudes in the larger angling population. While results were not conclusive as to how



consumptive orientation should be measured for the entire angling population (i.e., worldwide), they provide support for a theoretical framework for future examinations of attitudes of other sub-populations besides white anglers. It is reasonable to believe the scale will perform well with other sub-populations based on the results presented here and those of Hunt (2000) with African-American and Hispanic males. However, the scale did not perform as expected when translated into another language (Aas and Vittersø 2000). It is possible the constructs identified in the scale are not held globally, or that statements were worded in a manner that only apply to anglers in the United States. For example, Aas and Vittersø (2000) had to remove certain items and change the wording of some items because certain concepts are not used by Scandinavian anglers (e.g., “trophy fish”). Efforts need to identify items that are applicable across the worldwide angling populations, as well as identifying those aspects of consumptive orientation that are perhaps unique to other cultures.

Future research needs regarding women’s attitudes towards their consumptive orientation to recreational fishing were identified. While results lend support to the hypothesis that the scale was actually measuring four constructs related to consumptive orientation, the scale should be subjected to confirmatory factor analysis (CFA) with a sample of women anglers. Using CFA, results would be used to specify a model *a priori* and tested with the specific intent of verifying the four factors shown to influence responses to the consumptive orientation scale. By specifying the hypothesis *a priori*, the chance that a specific hypothesis will be supported is smaller (Kim and Mueller 1978a), which would strengthen the idea that there are four factors that generally

influence consumptive orientation. Once the model was tested in this manner, the model would be applicable to the larger population of both male and female anglers, and gender differences examined.

While the identification and measurement of activity-specific attitudes towards recreational fishing has been an important research question for over 20 years, there has been a lack of dialogue in the published literature regarding use of the scale first developed by Graefe (1980) and its psychometric properties. Hopefully this research and that which follows will open communication and expand interest in this theoretically and managerially important aspect of recreational fishing. Since going fishing involves catching fish to some extent and efforts are being made to provide services for a diversity of human experiences, the measurement of angler attitudes toward this activity-specific component of the experience requires additional attention.

## CHAPTER IV

### UNDERSTANDING TOURNAMENT ANGLER ATTITUDES TOWARDS THE CATCH-RELATED ASPECTS OF RECREATIONAL FISHING

#### **Introduction**

Tournament fishing is the most highly publicized sector of the U.S. recreational fishing industry. However, little is known about competitive fishing and the associated human dimensions of the sport. Over ten years ago, Schramm et al. (1991a) identified the various social, economic, and biological factors associated with competitive fishing and concluded more studies were needed to understand this angler segment. While these factors have received limited research attention, little is known about how tournament anglers differ within their social world and from non-competitive anglers in commitment to the sport and dependence on the fishery resource.

Previous work has shown that tournament anglers were significantly younger, fished more days per year, and were more committed to the overall social world of fishing than nontournament anglers (Loomis and Ditton 1987; Falk et al. 1989; Gillis and Ditton 1998; Wilde et al. 1998). Commitment to the activity is reflected by the affective attachment a person feels towards the activity, or the degree of self concept an individual receives from being involved in a particular social world (Unruh 1980; Buchanan 1985). The commitment shown by tournament anglers was reflected by their high membership in fishing clubs (Falk et al. 1989; Wilde et al. 1998) and in their perceived skill level when compared to other anglers (Loomis and Ditton 1987). Tournament anglers are also expected to have more invested in their fishing equipment

and consider fishing as their most important outdoor activity, a function of the side bets of being committed to the activity (Buchanan 1985). Side bets are defined as the investment, both personal and monetary, an individual would lose if they discontinued an activity (Johnson 1973). Generally speaking, tournament anglers are thought to be high specialization anglers when compared to nontournament anglers as they are likely heavily invested, both monetarily and socially, in their fishing experiences (Bryan 1977).

Anglers are motivated to participate in recreational fishing for several reasons. Some of these reasons are generic to participating in any outdoor recreational activity (e.g., getting away from the regular routine). Other reasons are specific to recreational angling (e.g., for the experience of the catch and to obtain fish for eating). Early work suggested anglers are motivated by four fundamental factors: temporary escape, achievement, exploration, and experiencing natural surroundings (Knopf et al. 1973). All of these factors are activity-general and can be experienced in other outdoor recreation activities. Studies of the overall angler population often result in an overstatement of activity-general motivations; however, activity-specific motivations become more important depending on the population under investigation (Fedler and Ditton 1994). Within the context of tournament fishing, a study of the general population of tournament anglers could result in misleading conclusions. Therefore, besides tournament anglers at the population level, two subsets of tournament anglers based on their frequency of tournament fishing were examined.

While activity-specific motivations are an important component of understanding why people fish, there are a set of identifiable factors directly related to the catch-related

aspects of fishing that enhance our basic understandings of these motivations. In order to measure these catch-related motivations, Graefe (1980) developed a scale of attitude statements and labeled these attitudes as consumptive orientation. Various forms of the scale, in terms of number of items and composition, have been used since (Hunt 2000; Sutton 2001; Sutton and Ditton 2001). Generally they showed that anglers express at least four identifiable attitudes towards catching fish. Currently, the scale consists of sixteen statements that elicit attitudinal responses on four factors related to resource-specific motivations. These consumptive attitudes can be labeled “catching something,” “catching numbers,” “catching large/ trophy fish,” and “keeping fish.”

Tournament anglers were expected to have different attitudes toward fishing than nontournament anglers. Tournament anglers are likely to place more importance on consumptive measures because of the importance of catching fish in tournament events (Holbrook 1975; Schramm et al. 1991b) and their commitment to the activity (Ditton et al. 1992) when compared to nontournament anglers. However, it was not known if there were important differences among tournament anglers regarding consumptive orientation that could have a bearing on this group’s overall commitment to management and conservation. Just as an avid minority of anglers accounts for the majority of days fished in the United States (the top 10% of anglers when classified by days fished accounted for about 45% of all fishing days in the United States) (Ditton 1980; Aiken 2004), a minority of avid tournament anglers may also skew human dimensions results for the entire tournament angler population.

Although no studies have directly compared consumptive attitudes for tournament anglers, other studies have used individual scale items to compare attitude differences among tournament and nontournament anglers. Loomis and Ditton (1987) compared saltwater tournament and nontournament anglers on seven of the items in the scale and found significant differences on two of the items: “The bigger the fish I catch, the better the fishing trip” and “It doesn’t matter to me what type of fish I catch.” They concluded that tournament anglers placed more importance on catching fish than nontournament anglers. Wilde et al. (1998) used 15 of the sixteen items to compare differences between tournament black bass anglers and nontournament black bass anglers on individual items. While they mentioned the four constructs the scale was intended to measure, they did not compare differences among scores for the constructs. They reported significant differences on what they labeled as “species or size of fish caught” and a “disposition of catch” factor (i.e., “keeping fish”). The wording of the scale items they used were different from those in the consumptive orientation scale used in this research (e.g., they had five statements related to the “keeping fish” factor whereas the current scale used four). They found no differences on the general orientation towards “catching something” items or the “catching numbers” items. Similarly, Gillis and Ditton (1998) found differences on nine of the items. Four items they found differences on were related to “catching something,” two items were related to “catching large/trophy fish,” and three items were related to “keeping fish.” They concluded that billfish tournament anglers were less interested in retaining fish than

billfish nontournament anglers and that the satisfaction of the former group was less dependent on catching fish (Gillis and Ditton 1998).

The purpose of this paper was to examine differences between tournament and nontournament anglers, as well as among tournament anglers when classified by their frequency of tournament fishing, on a number of variables related to commitment to fishing and dependence on the fishery resource, as measured by the consumptive orientation scale. In light of previous work on tournament anglers, it was expected that they would exhibit significant differences on the variables measuring commitment and consumptive attitudes. However, it was not known how frequency of tournament participation would affect differences within the tournament angling group.

### **Methods**

Data came from a statewide study of licensed anglers in Texas conducted in the spring of 2002. The sampling frame consisted of anglers that purchased a resident fishing license in FY 2001 (September 1, 2000—August 31, 2001). Overall, 10,000 were included in the first sample.

An 11-page questionnaire was administered to the sample. Questions were developed to assess anglers' behaviors, attitudes, preferences for fisheries management practices, tournament participation, and demographics. A modified version of the scale originally developed by Graefe (1980) was used to measure an anglers' level of consumptive orientation. The scale consisted of sixteen items, each of which had been designed to measure different sub-dimensions of the consumptiveness concept. Respondents were asked to indicate whether they agreed or disagreed with each of the

items. Level of agreement was measured on a 5-point agreement continuum ranging from “Strongly Disagree” to “Strongly Agree.” Four of the items were reverse coded for analysis purposes, so a higher additive score on each of the proposed subdimensions should indicate stronger positive attitudes for that subdimension (i.e., a higher score on the “keep” subdimension meant that an angler had a stronger positive attitude towards keeping fish).

Commitment was measured using four variables. Respondents were asked about the importance of fishing compared to other outdoor recreational activities, club membership, and their self perceived fishing ability. The importance of fishing was measured on a four-point scale ranging from “Your Most Important Outdoor Activity” to “Only One of Many Outdoor Activities.” Club membership was a dichotomous response of yes or no. Fishing ability was measured on a three point scale with the responses stating “Less Skilled,” “Equally Skilled,” or “More Skilled.” Finally, monetary investment was measuring using the replacement cost of all fishing equipment. Respondents were queried about the value of: reels; rods; tackle; electronic equipment; and boat, motor, and trailers. Responses were in an open-ended format, which were then summed for total fishing investment.

Participation in black bass tournaments was measured with a dichotomous variable. Respondents were asked if they participated in black bass fishing tournaments and, as a follow up question, how many tournaments they have participated in “since this time last year.” Respondents that have fished in at least one tournament “since this time last year” were considered tournament anglers and those that did not were considered



nontournament anglers, regardless if they have fished in black bass tournaments in previous years. Tournament anglers were further divided into “casual” tournament anglers or “avid” tournament anglers based on the number of tournaments they fished in the previous twelve months. Those anglers that fished in five or more tournaments, the average number of tournaments fished by tournament anglers in Texas (Anderson and Ditton 2004), were classified as “avid.”

Mailing procedures followed those advocated by Salant and Dillman (1994). Excluding non-deliverable questionnaires ( $n = 1,666$ ), an effective response rate of 40% was achieved. Completed surveys were received from 3,302 license holders; of this number, 162 were not filled out by the person to whom the questionnaire was mailed and were screened out, two were screened out because of underage age requirements ( $< 18$ ), and 14 were screened out for various reasons (e.g., afraid of government conspiracy). Additionally, 494 license holders indicated they did not fish since this time last year and were dropped from the analysis. Because this paper concentrated on freshwater tournament anglers, those anglers that fished only in saltwater ( $n = 701$ ) or did not indicate whether they fished in freshwater ( $n = 129$ ) were excluded from analysis. In addition, five respondents that did not indicate whether they fished in black bass fishing tournaments were deleted. Overall, data from 1,775 freshwater anglers were analyzed; however, not all respondents answered the questions used in the analysis, thus, results were based on responses to the particular question and varied with item non-response.

Results may be biased if the effects of non-response are not accounted for in mail surveys (Brown 1991). Thus, all results for the statistics presented were weighted for

non-response according to the procedures in Fisher (1996). Age was the only factor related to response; generally younger ( $< 38$ ) and older ( $> 55$ ) anglers were underrepresented in the sample. Nevertheless, generalizability of results is cautioned.

### *Analysis*

Data were checked for normality using procedures outlined in D'Agostino et al. (1990). Where nonnormality occurred for a particular interval level variable, differences were examined using the non-parametric Kruskal-Wallis  $k$ -sample test. For normal interval level data,  $t$ -tests were used. One assumption of the standardized  $t$ -test was that the two groups being examined had equal variances. When this assumption was violated (indicated by the Folded  $F$  statistic), the Satterthwaite correction was used to determine statistical significance (SAS Institute 2000). Ordinal level data were tested using the non-parametric Kruskal-Wallis  $k$ -sample test. Finally, nominal level data were examined using Pearson's chi-square test of homogeneity. In all cases the level of significance was set at 0.05; where statistically significant differences were detected, effect sizes were reported to facilitate understanding of the practical significance of differences (Gliner et al. 2001; Vaske et al. 2002). Effect sizes for chi-square and Kruskal-Wallis tests were reported using the  $\Phi$  value and effect sizes for  $t$ -tests were reported using  $d$ . Both values were classified as either "small" ( $> 0.1$  and  $0.2$ , respectively), "medium" ( $> 0.3$  and  $0.5$ , respectively), or "large" ( $> 0.5$  and  $0.8$ , respectively) effects. However, these values merely provided guidelines for analysis and practical significance was ultimately left to interpretation of results.

## Results

Differences between tournament and nontournament anglers were hypothesized on a number of variables related to their individual commitment to fishing. Results showed tournament anglers ranked the importance of fishing higher, were much more likely to be club members, and ranked their fishing ability higher than nontournament anglers (Table 15). The effect sizes for the importance of fishing and self-perceived fishing ability indicated a minimal relationship ( $\Phi = 0.11$  and  $0.12$ , respectively), while the odds of a tournament angler being a club member were about 11 times greater than a nontournament angler. Avid tournament anglers were significantly different from casual tournament anglers on these variables as well. There was a typical relationship between avid tournament anglers and their rank of fishing compared to other outdoor activities ( $\Phi = 0.34$ ). There was also a typical relationship ( $\Phi = 0.40$ ) between avid and casual tournament anglers on club membership, or it was more likely that avid tournament anglers were also club members, though the odds were weak (odds ratio =  $0.2$ ). There was a minimal relationship between the number of tournaments fished and the self-perceived skill level of the angler ( $\Phi = 0.14$ ).

For all equipment categories, tournament anglers had a significantly greater monetary investment (replacement cost) in reels, rods, tackle, electronics, and boats (Table 16). All variables showed a typical relationship between tournament anglers and the monetary amount invested in fishing equipment (range of  $\Phi = 0.26$  to  $0.32$ ). The number of tournaments fished in the previous twelve months also had a typical relationship with the monetary investment in fishing equipment (range of  $\Phi = 0.28$  to

Table 15.—Differences between casual and avid black bass tournament anglers in Texas and black bass tournament and nontournament anglers in Texas on variables related to commitment to fishing. Importance of fishing is reported as the mean rank on a scale where 1 = “Your Most Important Outdoor Activity,” 2 = “Your Second Most Important Outdoor Activity,” 3 = “Your Third Most Important Outdoor Activity,” and 4 = “Only One of Many Outdoor Activities.” Club membership is reported as a percentage belonging to a fishing club. Fishing ability is reported as the mean rank on scale where 1 = “Less Skilled,” 2 = “Equally Skilled,” and 3 = “More Skilled.”

Variable	Tournament anglers			P value	Effect <sup>a</sup>	All tournament anglers		P value	Effect <sup>a</sup>
	Avid	Casual					Nontournament anglers		
Importance of fishing	134.4	193.7		< 0.0001	.34	1356.0	1680.0	< 0.0001	.11
Club member	71.6	31.9		< 0.0001	.40	50.5	8.5	< 0.0001	.38
Fishing ability	178.0	154.2		0.01	.14	1927.0	1607.3	< 0.0001	.12

<sup>a</sup> Phi (Φ) value.

**Table 16.—Differences between casual and avid black bass tournament anglers in Texas and black bass tournament and nontournament anglers in Texas on monetary investment (replacement cost) in fishing. Dollar values are in U.S. currency. All comparisons were significant at the 0.05 level.**

Variable	Avid tournament anglers			Casual tournament anglers			All tournament anglers			Nontournament anglers			Effect (Φ)
	Mean	SE		Mean	SE		Mean	SE		Mean	SE		
Total investment	\$24,939	\$1,888		\$15,300	\$1,425		\$19,834	\$1,215		\$7,632	\$294		.29
Reels	983	75		591	45		776	45		338	13		.32
Rods	850	83		479	38		653	45		277	16		.32
Tackle	1,373	223		909	141		1,127	128		307	15		.32
Electronics	789	95		452	62		611	56		232	17		.29
Boat	20,943	1,671		12,869	1,310		16,667	1,086		6,478	267		.26

0.34). Avid tournament anglers had significantly more money invested in all categories than casual tournament anglers.

There were several significant differences between tournament and nontournament anglers on the consumptive orientation scale (Table 17). Alpha reliabilities were all in the acceptable range (0.74 to 0.79) and could not have been improved by deleting any of the individual items. Nontournament anglers had a stronger attitude than tournament anglers towards “retaining fish” (10.4 vs. 8.0, respectively) while tournament anglers had a stronger attitude than nontournament anglers towards “catching large/trophy fish” (13.7 vs. 12.2, respectively) and “catching numbers” of fish (13.2 vs. 12.4, respectively). There were no significant differences between groups on the “catching something” factor. The relationship for the “catching numbers” and “catching large/trophy” domains were minimal ( $d = 0.17$  and  $0.35$ , respectively). There was a typical relationship between groups for “retaining fish” ( $d = 0.52$ ).

When tournament anglers were subdivided by the number of tournaments fished in “since this time last year,” there was only one significant difference in consumptive orientation between groups (Table 18). The consumptive orientation factors remained reliable as measured by Cronbach’s alpha (range = 0.74 to 0.77), and could not have been improved by deleting any variables. Avid tournament anglers placed less importance on “retaining fish” than casual tournament anglers (6.7 vs. 9.1, respectively), resulting in a typical relationship between the number of tournaments fished and the attitude towards retaining fish ( $d = 0.57$ ).

**Table 17.—Differences between black bass tournament and nontournament anglers in Texas on factors related to catch-related attitudes toward recreational fishing. Factors are the sum of individual responses to attitudinal statements where 1 – strongly disagree; 2 – disagree; 3 – neutral; 4 – agree; 5 – strongly agree. Asterisks indicate significant differences ( $P < 0.05$ ) between angler groups.**

Domains and items	Item total correlation	$\alpha$ if item deleted	Tournament anglers		Nontournament anglers	
			Mean	SD	Mean	SD
Catching something ( $\alpha = .78$ )			10.10	4.85	10.64	4.68
A fishing trip can be successful even if no fish are caught <sup>a</sup>	0.59	0.72				
When I go fishing, I am just as happy if I don't catch any fish <sup>a</sup>	0.57	0.73				
If I thought I wouldn't catch any fish, I wouldn't go fishing	0.56	0.74				
When I go fishing, I'm not satisfied unless I catch at least something	0.63	0.70				
Number of fish caught ( $\alpha = .77$ )			13.19*	4.81	12.43*	4.32
The more fish I catch, the happier I am	0.49	0.75				
A successful fishing trip is one in which many fish are caught	0.66	0.66				
A full stringer is the best indicator of a good fishing trip	0.58	0.71				
I'm happiest with a fishing trip if I catch at least the limit	0.56	0.72				
Catching large/trophy fish ( $\alpha = .74$ )			13.72*	4.58	12.21*	4.33
I would rather catch 1 or 2 big fish than 10 smaller fish	0.48	0.71				
The bigger the fish I catch, the better the fishing trip	0.58	0.66				
I'm happiest with the fishing trip if I catch a challenging game fish	0.54	0.68				
I like to fish where I know I have a chance to catch a "trophy" fish	0.54	0.68				
Retaining fish ( $\alpha = .79$ )			8.00*	4.52	10.43*	4.58
I usually eat the fish I catch	0.55	0.77				
I'm just as happy if I don't keep the fish I catch <sup>a</sup>	0.66	0.70				
I want to keep all the fish I catch	0.51	0.77				
I'm just as happy if I release the fish I catch <sup>a</sup>	0.68	0.69				

<sup>a</sup> Item reverse coded for analysis purposes.

**Table 18.—Differences between avid and casual black bass tournament anglers in Texas on factors related to catch-related attitudes toward recreational fishing. Factors are the sum of individual responses to attitudinal statements where 1 – strongly disagree; 2 – disagree; 3 – neutral; 4 – agree; 5 – strongly agree. Avid tournament anglers fished in 5 or more tournaments “since this time last year.” Asterisks indicate significant differences ( $P < 0.05$ ) between angler groups.**

Domains and items <sup>a</sup>	Item total correlation	$\alpha$ if item deleted	Casual tournament anglers		Avid tournament anglers	
			Mean	SD	Mean	SD
Catching something ( $\alpha = .76$ )			9.78	4.34	10.46	5.46
A fishing trip can be successful even if no fish are caught <sup>a</sup>	0.64	0.67				
When I go fishing, I am just as happy if I don't catch any fish <sup>a</sup>	0.47	0.75				
If I thought I wouldn't catch any fish, I wouldn't go fishing	0.52	0.73				
When I go fishing, I'm not satisfied unless I catch at least something	0.63	0.67				
Number of fish caught ( $\alpha = .77$ )			12.71	4.57	13.74	5.04
The more fish I catch, the happier I am	0.48	0.76				
A successful fishing trip is one in which many fish are caught	0.70	0.64				
A full stringer is the best indicator of a good fishing trip	0.50	0.75				
I'm happiest with a fishing trip if I catch at least the limit	0.62	0.69				
Catching large/trophy fish ( $\alpha = .74$ )			13.64	4.42	13.81	4.84
I would rather catch 1 or 2 big fish than 10 smaller fish	0.53	0.68				
The bigger the fish I catch, the better the fishing trip	0.56	0.66				
I'm happiest with the fishing trip if I catch a challenging game fish	0.49	0.70				
I like to fish where I know I have a chance to catch a “trophy” fish	0.55	0.66				
Retaining fish ( $\alpha = .74$ )			9.09*	4.36	6.72*	3.95
I usually eat the fish I catch	0.54	0.69				
I'm just as happy if I don't keep the fish I catch <sup>a</sup>	0.56	0.68				
I want to keep all the fish I catch	0.46	0.72				
I'm just as happy if I release the fish I catch <sup>a</sup>	0.62	0.65				

<sup>a</sup> Item reverse coded for analysis purposes.



## Discussion

Tournament anglers were a significantly different segment of the angling population as displayed through their commitment to the activity and their dependence on the fishery resource. These differences have an important bearing on both the management of the resource, as well as the human side of the management equation. Possible explanations for the differences reported here included the tournament format and the socialization process that likely accompanies tournament angling. The lack of differences in consumptive orientation among tournament anglers is examined further as well.

Study results supported the idea that tournament anglers are more committed than nontournament anglers, indicated by their higher skill levels, club membership, importance of fishing when compared to other outdoor activities, and monetary investment in fishing. Previous work supported the results for club membership (Wilde et al. 1998) and perceived skill level (Loomis and Ditton 1987). The social network from being a member in a club is important for tournament anglers' self perception and would be lost if the angler ceased participation in tournament fishing. It was not known, but expected, that the club network underlies that the majority of tournament anglers' friends fish (Anderson et al. 2002a, 2002b), and that social motivations differ between tournament and nontournament anglers (Loomis and Ditton 1987). It was not clear why tournament anglers had about the same amount of experience as nontournament anglers (Wilde et al. 1998); based on the concept of commitment, experience should play a vital role in both establishing the social network and solidifying the tournament angler's

fishing identity. Age could have an effect on experience levels; tournament anglers were younger than their nontournament counterparts but fished more days per year (Wilde et al. 1998). Perhaps as anglers get older they do not maintain the internal desire to compete and are participating to relax. By rejecting other activities and participating heavily in fishing, tournament anglers have built their self concept around their activity and probably would not now be able to pursue other activities due to the time invested in gaining the experience to be a successful tournament angler.

Although tournament anglers have been shown to be highly committed anglers, they should not be viewed as the only group of committed anglers in the world of fishing. It is likely that other anglers would demonstrate the same pattern of skill, participation, and investment as the anglers in this study and elsewhere, but have not been socialized to participate in tournament events. For example, in a study of billfish anglers, Gillis and Ditton (1998) reported no significant differences between tournament and nontournament anglers on age, education, income, and days fishing in fresh water or saltwater from the shore. They reported differences in years of billfishing experience and number of billfish trips outside the U.S. in the previous year. They also reported no differences on mean daily expenditure for the billfish trip. Although billfish anglers generally reported high commitment levels, Ditton and Stoll (2003) point out there are likely various levels of specialization among this social world. Obviously, there are some other reasons beside commitment to the activity that motivates anglers to participate in tournaments.

Based on the high commitment levels of tournament anglers, it was expected that their attitudes towards the consumptive orientation factors were stronger than nontournament anglers. As anglers become more committed to the activity, they expect greater rewards for their continued participation, and will likely place greater pressure on the fishery resource. Other studies have suggested that tournament anglers, considering their high specialization level, should place less importance on the activity-specific attitudes towards fishing (Ditton et al. 1992). The reasoning here was that as anglers become more specialized, they receive most of their benefits from the extraneous factors of participation, such as being outdoors or with friends. This was not the case for anglers in this study. Tournament anglers placed more importance on two of the consumptive dimensions (“number of fish” and “catching large/trophy fish”) and less importance on “retaining fish.” Both groups placed nearly equal importance on the fourth item (“catching something”). It is clear that tournament anglers placed more importance on activity-specific attitudes as defined by the consumptive orientation scale. It is not known, however, if this was a result of their commitment to the activity, or the format of tournament fishing. Based on the most common format of awarding prizes based on the total weight of fish (usually with restrictions on the number of fish in the creel), it was not surprising that tournament anglers had a stronger attitude towards catching more and larger fish; it is necessary for their success in the tournament. However, given that the scale was administered in a “general” fishing sense (i.e., respondents were not asked to think about specific fishing experiences, but rather whether they agree or disagree with the statements), the notion that high specialization

anglers place less importance on activity-specific attitudes than low specialization anglers needs to be reexamined. Of course, tournament anglers' attachment to the activity may have influenced their judgment of the statements and the results may be indicative of attitudes towards tournament fishing.

Although results suggested that tournament and nontournament anglers were different in terms of commitment levels to the activity and the strength of their consumptive attitudes, examining differences among tournament participants provided some insight on differences in the tournament social world. As shown here and previously (Loomis and Ditton 1987; Falk et al. 1989; Gillis and Ditton 1998; Wilde et al. 1998), tournament anglers are a different segment than nontournament anglers. However, since previous research has suggested that social worlds can be further broken down into subworlds (Unruh 1979, 1980), the differences between avid and casual tournament anglers may enhance understanding the diversity of the tournament angling population. While the classification of avidity by the number of tournaments fished during the previous year was crude, significant group differences were revealed. Avid tournament anglers were significantly different from casual tournament anglers on all variables related to commitment. However, this difference in commitment was not reflected by their consumptive orientation; avid tournament anglers only had significantly different attitudes towards "retaining fish." As a result of these differences between avid and casual tournament anglers, it was likely that avid tournament anglers influenced the results between all tournament anglers and nontournament anglers (Thomson 1991). Future research should consider this bias by looking only at avid

tournament anglers; however, it was not the intent of this research to examine the effects of avidity bias.

Given the only difference between avid and casual tournament anglers was on “retaining fish,” it is unlikely that tournament experience played a major role in the formation of consumptive attitudes. Avid tournament anglers nearly indicated the lowest possible score possible on “retaining fish” (the lowest possible score would be four; avid tournament anglers averaged about seven). It was not known if tournament anglers exhibited the strength of attitude prior to becoming a tournament angler, or if the experiences of fishing in tournaments strengthened their attitude towards “retaining fish.” As discussed above, black bass tournament formats heavily promote catching large fish and releasing them; perhaps the experience of fishing in these types of events has strengthened this attitude. This would generally apply to avid tournament anglers regardless of whether they were fishing in a tournament or not.

Even though most fisheries agencies do not have the authority to manage tournament and nontournament anglers differently, social conflicts often require them to deal with issues associated with freshwater tournaments. These issues could include perceptions of crowding, limited access, and conflict with local anglers (Kerr and Kamke 2003). Differences reported here and elsewhere can shed some light on the possible causes of these conflicts. The perception of crowding on the reservoir is likely a function of different angler motivations, preferences, and expectations (Ditton et al. 1983). As shown here, there were significant differences in consumptive attitudes between tournament and nontournament anglers; other studies have reported

motivational differences as well (Wilde et al. 1998). These differences suggest tournament fishing and nontournament fishing are different activities and the anglers participating are expecting distinctive experiences. Tournament and nontournament anglers differ in their use of the resource (tournaments place greater stress on the resource) and the expectations of the lake setting on a particular day of fishing (tournament anglers know there will be a greater number of anglers on the lake; nontournament anglers may not). When something interferes with the attainment of the expected experience, conflict occurs (Jacob and Schreyer 1980). If managers understand the reason for the social issues associated with tournament events, they can avoid certain types of conflict by changing the expectations of one or both groups. For example, better publicity of local and club tournaments would let local anglers know that more anglers will be on the lake and the angler can either avoid the lake on the tournament day, or change their expectation of “non-crowded” conditions for that fishing trip. Since many states do not require permits for tournament events, they have no means of knowing when, or how often, fishing tournaments occur (Kerr and Kamke 2003).

Study results will add to the growing body of knowledge concerning fishing tournaments and hopefully provide some unique insight into this consumptive activity. Based on the commitment levels of most tournament anglers, it is likely they will have an active part in the fishery management process and demand increased attention to their particular issues. By understanding this particular group’s wants and needs, managers will be able to provide experiences that are more satisfying for all clientele.

## CHAPTER V

### SUMMARY AND CONCLUSIONS

The primary purposes of this dissertation were understanding the nature of an attitudinal scale designed to measure the consumptive orientation of recreational anglers and filling a gap in the published literature regarding measurement using the scale. In order to confirm the four attitudes measured by the scale, I hypothesized and tested a model using a sample of male anglers in Texas. From previous literature, it was thought that a different subculture may interpret the attitudinal statements differently; thus, the structure of the scale was explored using women as a separate sample. Finally, an example of how the scale could be used was yielded by examining differences between tournament and nontournament anglers' attitudes towards the four constructs measured by the scale. Differences found were related to the commitment level of tournament and nontournament anglers. Further analysis examined how avidity may have affected results from angler group differences.

Overall, results were mixed on the hypothesized model used to confirm the scale. While results indicated dropping four of the statements would not result in a significant change in the structure of the scale, the results also confirmed that four distinct attitudes were measured by the consumptive orientation scale. The use of the scale with the larger angling population was supported by arriving at the same structure using a sample consisting of women. Finally, it was shown that the scale was useful for examining activity-specific differences in angling social worlds. The differences found further

existing knowledge of tournament anglers and the expectations they have from their fishing experience. The following sections continue the discussion of these key findings by concentrating on the overarching implications of results presented in order to place consumptive orientation within the larger body of knowledge concerning outdoor recreation research. This chapter concludes with an examination of the managerial implications of this research and provides future research direction for those interested in continuing the dialog about consumptive orientation.

### *The Consumptive Orientation Scale*

Although some version of the consumptive orientation scale has been in use since the early 1980s, most of the work on the structure and meaning of scale items has remained either in agency research reports or in “in-house” knowledge at various research labs around the United States. This section reviews what the current research accomplished and how results can be used with the larger angling population.

The consumptive orientation scale appeared to be a valid and reliable instrument for measuring attitudes toward four aspects of the recreational fishing experience. The results from the CFA and those of Aas and Vittersø (2000) support the idea that the scale is reliable for measuring consumptive orientation. Unlike the latter research, which concluded the scale measured a general consumptiveness factor and three subfactors, my results showed there were four distinct factors measured by the scale, which were labeled “attitudes towards catching something,” “attitudes towards catching numbers of fish,” “attitudes towards catching large/trophy fish,” and “attitudes towards keeping fish.” Also, it is apparent that linguistic translation of scale items should retain the idea



of the individual item to maintain the internal consistency of scale items. Given other cultures may not use the same terminology as anglers in the United States, different items may be needed for specific cultures that reflect the basic idea in each statement. Translation of scale items as written would assume that the underlying constructs are applicable across cultures.

The consumptive orientation scale has obvious comparisons to other scales used to measure recreation motivations. One of the motivation scales most often used is the REP scale developed and refined by Driver and his associates. Whereas the consumptive orientation scale measures fishing-specific attitudes (i.e., the importance of the catch experience), it is different from the REP scale due to the latter's ability to measure activity-general motivations across a range of activities (i.e., to get away from the regular routine). However, the version of REP scales generally used in fisheries literature includes items that are specific to recreational fishing: "to obtain fish for eating," "for the experience of the catch," and "to obtain a 'trophy' fish" (Fedler and Ditton 1994). Although these items measure activity-specific motivations, they do not capture the nuances of the entire catch experience like the suite of items in the consumptive orientation scale. It is probable that two of the attitudes measured by the consumptive orientation scale are consistent with the motivations from the REP scale; attitudes towards "catching large/trophy fish" should be consistent with the motivation item "to obtain a 'trophy' fish," and attitudes towards "retaining fish" should be consistent with the motivation item "to obtain fish for eating." It is also likely that attitudes towards "catching something" would be consistent with the motivation item

“for the experience of the catch.” In addition, the consumptive orientation scale is more consistent in measuring activity-specific attitudes as it uses multiple items for a single measure (Burnkrant and Page 1988). The continued use of both scales is suggested to measure both activity-general items and those motivations and attitudes specific to fishing.

Confirming the four attitudes present in the consumptive orientation scale led to greater understanding of angler behavior. Since results showed that there are at least four attitudes related to the catch-related motivations for fishing, the theory of reasoned action (Fishbein and Ajzen 1975; Ajzen and Fishbein 1980) provides one of many frameworks for using these attitudes to predict specific angler behavior. Basically, if people have positive attitudes towards a behavior and perceive peer approval of the behavior, then they are more likely to have a positive intention for performing a behavior. Usually, this type of behavioral theory is useful for predicting participation in activities (Rossi and Armstrong 1999; Hrubes et al. 2001), or for explaining support for various policies (Bright et al. 1993; Pate et al. 1996). Based on an understanding of the attitudes presented in this research, it was easy to envision a number of behaviors where consumptive orientation influenced intentions for performing the behavior. For example, understanding a person’s attitudes towards retaining fish can help explain choices about fishing location (based on creel limits). While sounding simplistic, this basic understanding of angler attitudes has been lacking in most applied research. These results should contribute to the understanding of consumptive attitudes and their role in behaviors affecting various management scenarios.

One behavior for which consumptive attitudes could provide insight is recreation substitution. When anglers are faced with choosing among various activities, they are expecting to fulfill their needs for participating (i.e., their experience preferences). Consumptive attitudes provide an understanding as to why anglers are more likely to choose other types of fishing than an entirely different activity altogether (Manfredo and Anderson 1987). When anglers are faced with a substitution decision, it is expected those anglers that rate the consumptive orientation items high would be more likely to indicate other types of fishing are an acceptable substitute rather than choose a completely different activity. Activity-general motivations, such as those measured by the REP scale, are more likely to be fulfilled in a variety of activities and probably provide a better indicator for activity substitutes (Ditton and Sutton 2004). However, it is not known if experience with an activity influences motivational choices (Williams et al. 1990), which, in turn, influences the decision to substitute the activity when faced with a choice. In other words, as anglers become more experienced, they are more likely not to choose an activity substitute regardless of their motivations for participating.

The use of the consumptive orientation scale to categorize anglers into groups is useful since consumptive attitudes are relevant to fishery managers. Most studies placed anglers into “high” or “low” categories (Fedler and Ditton 1986; Aas and Kaltenborn 1995) or used consumptive attitudes in a multivariate analysis (Fisher 1997; Sutton and Ditton 2001). This dissertation supports the idea of using consumptive scores as an indicator of other theoretically sound classification schemes (i.e., specialization). However, the results presented were inconclusive as to what constitutes a “high” score

on the consumptive factors. If researchers continue to use the entire suite of scale items, as suggested, the theoretical midpoint of each factor is a score of twelve (midpoint between the lowest score of four and the highest score of twenty). However, it is unlikely a score of twelve represented the true mean of the population under investigation. For example, the results from Chapter IV indicated none of the groups had a mean score of a “perfect” twelve. The closest scores to the theoretical mean were for “catching numbers” and “catching large/trophy fish” for the nontournament angler group. Resolving the true mean score for each attitude should allow researchers to begin to look at group differences that have managerially relevant implications. In other words, once the true mean for all anglers is known on a given attitude, practical significance of differences will be easy to interpret for a group that averages above or below the true mean score.

Although results can only be generalized to similar populations from which the sample was drawn, they strengthen previous research that made use of the scale. As noted previously, this was really the first opportunity for the current scale items to be tested and discussed. For example, Sutton (2003) used a version of the scale to examine catch-and-release behavior among freshwater anglers, concluding that an angler’s attitudes were an important component of the choice an angler makes when deciding to keep a fish. Although he presented alpha reliabilities for the items used in the scale, prior published research had not focused on the confirmation of the structure of the current scale. Also, no published research had focused on the validity of the scale, i.e., the scale actually measures four distinct consumptive attitudes. While Aas and Vittersø

(2000) mentioned the reliability of the scale used in their research, they did not examine the validity of their items other than through their factor analysis. The current examination of discriminant validity was important in that it showed the four items were fairly correlated to each other, however, they were distinct attitudes and the scale was valid for measuring these attitudes. Content validity of items should be examined further by reaching agreement in the literature on the factor structure and names of the scale. Rather than rely on reporting the internal consistency of scale items (i.e., the items are consistently measuring the same construct), the accuracy of the consumptive orientation scale for measuring catch-related attitudes was supported.

#### *Gender and Consumptive Orientation*

Although research results did not provide much insight to the gender-based analysis of recreational fishing, they provided the basis for examining many of the hypothesized differences between men and women and how gender affects the fishing experience. This section examines how consumptive orientation may constrain women from participating in fishing as well as consider some of the possible differences between men and women on their consumptive attitudes.

The consumptive attitudes that accompany fishing are expected to provide some of the many barriers women must overcome before participating in the social world of fishing. Although certain constraints, such as gender roles, lack of opportunity, peer approval, and self concept, have also been shown to constrain young women from participating in outdoor recreation (Culp 1998), it was not known how motivations for an activity might constrain women from participating. The attitudes studied here could

be considered intrapersonal constraints (Crawford et al. 1991), and could keep women from participating based on their perceived skill level and ability for overcoming their constraints. The use of consumptive attitudes also helps explain women's lack of involvement through the theory of planned behavior. Like the use of consumptive attitudes to explain various angling behavior, the behavioral control component of the theory of planned behavior provides the impetus for explaining lack of female involvement in fishing. For example, woman anglers may have strong attitudes towards "catching something," but may feel they do not have the requisite skills to catch a fish. Thus, they may be constrained from even trying based on the strength of their attitude and perceived skill level (Shinew et al. 1995). Similarly, potential women anglers may progress along the model of planned behavior (positive attitudes towards the behavior and positive feedback towards the behavior), but feel they have no control over their success for catching a fish. Regardless of the model used to explain lack of participation in fishing, helping women to overcome these constraints to participation could play a major role in recruiting and retaining women interested in fishing (Fedler and Ditton 2001).

Given the lack of available literature regarding gender differences on fishing motivations, a cursory examination of the frequency distributions on the consumptive orientation scale items revealed some useful comparisons. Women appeared to have weaker attitudes towards "catching something" and "catching large/trophy gamefish." It appears that women's satisfaction with a fishing trip is not dependent on the act of catching fish and that catching a trophy fish is not an essential experience to most

women. These differences disagreed somewhat with previous results given in Adams and Steen (1997) who showed that women hunters were as achievement oriented as males, but placed more importance on the aesthetic and social aspects of their hunting experience than males. Perhaps women perceive fishing as more of an overall social activity and the social component of the fishing experience overrides motivations for achievement in this activity. It may be that women anglers are as achievement oriented, but only when other aspects of fishing are experienced. In other words, women may not feel they have to catch fish to be satisfied with the experience until satisfaction with the social component of the experience is met. Women appeared to have been more likely to agree to the statement “I usually eat the fish I catch.” This difference agreed with results of Toth and Brown (1997) that showed that fishing for women is more of a social experience, and eating the fish is a necessary part of the experience. This would also follow the stereotypical role of women in fishing as the person responsible for cleaning and cooking the catch. Men are likely to report social motivations for fishing, however, the social interaction men seek may be related to the competition among their social counterparts.

Regardless of the future of gender based analysis of consumptive orientation, the overarching result from this research is the ability of the scale items to measure consumptive attitudes in the larger angling population. However, there may be specific consumptive attitudes that women possess that were not measured by the scale. As previously mentioned, it appeared that women were more likely to rate the social component of fishing high and there may be consumptive attitudes that provide better

measurement for consumptive attitudes that gauge this social component. For instance, there have been some scale items that are not in the current version of the scale that were intended to measure desire to catch specific species of fish. While previous research has not concentrated on gender differences for species preference, based on the notion that women are more into the social component of fish (Adams and Steen 1997; Toth and Brown 1997; Viriden and Walker 1999), they would be expected to prefer to catch certain species (i.e., fish that are good to eat).

### *Tournament Angling*

Rather than concentrate solely on the theoretical underpinnings of the consumptive orientation scale, this dissertation also demonstrated how to use the consumptive orientation scale to analyze angler group differences. By focusing on two different groups of anglers (tournament and nontournament anglers), it was expected there would be differences in how these groups thought about use of the fishery resource. This section discusses these differences and how the theory of commitment affected anglers' consumptive orientation.

Because of their high level of commitment, it was expected that tournament anglers' attitudes towards the consumptive orientation factors would be stronger than nontournament anglers. As anglers become more committed to the activity, they expect greater rewards for their continued participation, and will likely place greater pressure on the fishery resource. Other studies have suggested that tournament anglers, considering their high degree of specialization, place less importance on the activity-specific motivations for participating in fishing (Ditton et al. 1992). The reasoning here is that as



an angler becomes more specialized, they receive most of their benefits from the extraneous factors of participation, such as being outdoors or being with friends. This was not the case for the anglers in this study. It was not surprising that tournament anglers had a stronger attitude towards catching more and larger fish; this is necessary for their success in the tournament. As mentioned previously, it was not known if tournament anglers responded to the questionnaire in a general fishing sense, or if their attachment to the activity of tournament fishing influenced their responses to the consumptive orientation items. It was likely their affective attachment to the tournament experience was a cause for indicating their strong attitudes towards consumptive orientation. This would explain why these high specialization anglers still placed increased importance on activity-specific motivations.

Study results supported previous findings that tournament anglers have high commitment levels when compared to nontournament anglers. This high level of commitment could have also provided the foundation for differences on consumptive orientation items. Since tournament anglers were heavily invested in the fishing social world, they might expect greater rewards from their continued participation in the activity. The commitment literature suggests these rewards manifest themselves in the identity of self as belonging to the activity or social world (Johnson 1973; Buchanan 1985). In the social world of tournament angling, success depends on beating other competitors and receiving prizes. Ultimately, most tournament anglers would like to become professionally sponsored and be able to “wear” their success in the form of sponsor patches, hats, clothing, etc. (Yoder 1997). By indicating their strong attitudes

towards consumptive orientation, anglers were, in effect, indicating they value the success, and continued feedback, of being a tournament angler.

The theory of specialization provided some additional insight into the social world of tournament angling and led to additional questions regarding differences between tournament and nontournament anglers. It was apparent from the results of this research that tournament anglers belonged to a very different social world than nontournament anglers. However, as has been mentioned previously, it is likely that some nontournament anglers possess many of the same characteristics of tournament anglers. Similar to the analysis of how avidity affected consumptive attitudes, it is likely that high specialization nontournament anglers would be more like tournament anglers than they would be like low specialization nontournament anglers (Fisher 1997). Nevertheless, there must be differences that differentiate tournament anglers and high specialization nontournament anglers that cause tournament anglers to participate in a competitive event. Previous research suggested the theory of commitment provides the understanding of tournament participation (Scott and Godbey 1994). Based on the results in this dissertation, this could be the case for fishing tournament participation; avid tournament anglers were significantly different from casual tournament anglers on all variables related to commitment. It is not known if there would be differences between high specialization nontournament anglers and tournament anglers on these same variables.

### **Future Research Needs**

Understanding the properties of the consumptive orientation scale led to other questions regarding the application of the scale and its usefulness to explain various angler behaviors. The results of this dissertation should open a dialog for future research regarding the psychometric properties of the scale and its employment in questionnaire research. This section examines some of the future research needs regarding consumptive orientation and develops an agenda to continue the dialog on this concept.

Future research should make use of the sixteen items reported in this dissertation. While four of the items were shown to be not significant in the overall model structure, they could prove useful in testing the model in other populations. Furthermore, this dissertation hypothesized only one original model. An effort was made to test the model used by Aas and Vittersø (2000), but the items were so different that competing models could not be developed. A competing model could be tested against the model proposed here using a nested models approach (Anderson and Gerbing 1988).

It was not known how survey timing affected responses to the consumptive orientation scale. Data for this analysis came from a statewide survey asking anglers about their general fishing experiences. If anglers had not been fishing recently, their attitudes may not have been clear when responding to scale items. Timing of responses has been shown to affect satisfaction ratings (Hull et al. 1992; Stewart and Hull 1992), and it may be just as important in determining angler responses to the consumptive orientation scale items. As in satisfaction research (Manning 1999), it can be hypothesized that anglers may adjust their attitudes based on the actual experience from

the fishing trip. In other words, if anglers did not catch any fish, they might be expected to report a lower score for “catching something” to compensate for their lack of success. These problems can be resolved by asking anglers about their consumptive attitudes both before and after a specific fishing trip (Manfredo et al. 1996).

Future research regarding women’s attitudes towards their consumptive orientation to recreational fishing is needed. While results lent support to the hypothesis that the scale is actually measuring four constructs related to consumptive orientation, the scale should be subjected to confirmatory factor analysis (CFA) with a sample of women anglers. Using CFA, results could be used to specify a model *a priori* and tested with the specific intent of verifying the four factors shown to influence responses to the consumptive orientation scale. By specifying the hypothesis *a priori*, the chance that a specific hypothesis will be supported is smaller (Kim and Mueller 1978a), which would strengthen the idea that there are four factors that generally influenced consumptive orientation. Once the model is tested in this manner, the model would be applicable to the larger population of male and female anglers, and differences between genders examined.

Future research should not consider avidity bias by only looking at avid tournament anglers. The differences between avid and casual tournament anglers may enhance understanding the diversity of the tournament angling population. While the operationalization of avidity by the number of tournaments fished in during the previous year was crude, significant differences were revealed. Avid tournament anglers were significantly different from casual tournament anglers on all variables related to

commitment. However, the difference in commitment was not reflected in their consumptive orientation; avid tournament anglers only had significantly different attitudes towards “retaining fish.” As a result of these differences between avid and casual tournament anglers, it is probable that avid tournament anglers heavily influenced the results between all tournament anglers and nontournament anglers reported here (Thomson 1991).

### **Management Implications**

It is important to understand the theoretical underpinnings of the consumptive orientation scale in order to provide data relevant to management of fishery resources. This section discusses how data gathered with the scale can assist fishery managers and increase their knowledge of clientele.

Understanding consumptive orientation should shed some light on other recreation concepts applicable to fisheries management. While the results presented came from a cross-sectional analysis of a general angler population, it was not known how their activity-specific motivations might differ according to their various angling experiences. For example, an angler may have a particular set of attitudes for going on a fishing trip with friends. It would be expected that these attitudes would change if the same angler was going fishing with family (Field and O'Leary 1973; Buchanan et al. 1981). Perhaps the attitude towards “catching large/trophy fish” would also be greater when fishing with friends when competition to catch the biggest fish is high, but this same attitude would be weak when fishing with family and replaced with a stronger attitude towards “catching something.” Other studies have shown that motivations

change as a result of previous success (Finn and Loomis 2001), therefore it is expected that attitudes would be different based on situational variables.

Tournament fishing and nontournament fishing are different activities with anglers expecting different experiences. Tournament and nontournament anglers differ in their use of the resource and the expectations of the lake setting on a particular day of fishing. If managers understand the reason for the social issues associated with tournament events, they can avoid potential conflict by changing the expectations of one or both groups. Based on the planned behavior framework (Ajzen 1991), it would be possible to modify the deviant behavior associated with conflict by changing the expected results of an angler's fishing trip (Fishbein and Manfredo 1992; Vincent and Fazio 1992; Bright et al. 1993).

The results of this paper will hopefully add to the growing body of knowledge concerning fishing tournaments and provide some further insight to this consumptive activity. Based on the commitment levels of most tournament anglers, it is likely they will have an active part in the fishery management process and demand increased attention to their particular issues. By understanding this particular group's wants and needs, managers will be able to provide more satisfying experiences for all clientele.

Managers should continue to direct attention to historically underrepresented groups in the fishing population. By directing their attention to these groups, they can increase the likelihood that license sales will grow in the future. However, unless managers can deliver the experiences various demographic groups are expecting, it is unlikely these groups will continue participation in a dissatisfying activity.

The attitudes identified in this dissertation can be used as a segmentation tool that should be more useful to managers for determining angler wants and needs than the activity-general items usually reported in the literature as being more important motivators for anglers. When coupled with other group preferences, a typology of anglers can be built that managers can use to market various experiences more effectively. Fisher (1997) provided a useful cluster analysis using consumptive orientation as one of many variables on which anglers were grouped into specialization level. These groups would likely seek different experiences and express different opinions on fishery management alternatives. Without an understanding of the motives and associated actions related to consumptive orientation, fishery managers will continue to manage anglers as a homogenous group resulting in dissatisfied customers and continuing disagreement with the current management regime.

Fishery managers have historically misunderstood fishing related motivations. If managers assume the activity-general motivations usually reported in the literature are solely responsible for going fishing, they will overlook the fact that catching fish is an integral part of the experience and underlies many of the activity-general motivations anglers indicate in survey research. The case of east Matagorda Bay provided a real world management scenario where just such a thing occurred. Managers attempted to restrict harvest in this small Texas bay based on their understanding that keeping fish was not an important aspect of the fishing experience. After several protests, the regulations were changed and managers questioned the validity of motivation studies related to recreational fishing (Matlock et al. 1988; Ditton and Fedler 1989). What

managers failed to realize is how consumptive orientation is intertwined with other activity-general motivations. The results of this dissertation provide additional understanding so managers can avoid these mistakes in the future.



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## Selected Publications:

Oh, C., R. B. Ditton, D. K. Anderson, D. Scott, and J. R. Stoll. 2005. Understanding differences in nonmarket valuation by angler specialization level. *Leisure Sciences* 27(3):263-277.

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